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ABSTRACT

The second of three parts of a computer awareness program for grades K-9, this five-unit guide includes objectives, notes and explanations, and suggested activities for developing basic concepts, skills, and attitudes related to computer technology for grades 4-6. Student activity worksheets are included for each unit. Unit 1 covers care for a computer and its peripherals, and demonstrates simple trouble-shooting techniques and the use of the "immediate" mode. Unit 2 identifies the components of a computer and explains their basic operations. In Unit 3 computer components and processes are introduced and internalized through a variety of concrete activities, most of which do not require a computer. Modern calculators, electronic games, and toys are compared and contrasted to the computers, and computer capabilities and limitations are examined. Unit 4 describes the development of calculation aids from finger calculators to computers, emphasizing the increase in complexity and capacity of calculation aides. The final unit emphasizes the basic understanding that people make computers work. (LMM)

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COMPUTER AWARENESS 4-6

DRAFT PILOT GUIDE

DEPARTMENT OF EDUCATION
JUNE 1983

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INTRODUCTION

Through Computer Awareness schools can contribute not only to the students' acquisition of basic technological and related occupational information but also to the development of their ability to make informed decisions involving personal attitudes and values. For example, an examination of potential uses and abuses of computers today can support students' skills in evaluating and predicting the impact of computer applications in the future.

For purposes of this document the operational definition of "computer awareness" will be that proposed by the Manitoba Computer Awareness Task Force (K-12) in March 1982. The Task Force considered that computer awareness includes: an understanding of what computers can and cannot do; interaction and communication with computers; using computers to solve problems; and using computers as a tool in the educational setting. The overall goal of computer awareness is to promote an understanding of computer applications in the academic, business and social arenas with their resulting impact upon society.

This document is part of a K-9 Computer Awareness package and is intended to provide the teacher with information needed to establish an awareness program thought appropriate for all students in these grades. The K-9 units have been divided into three packages; namely, K-3, 4-6, and 7-9. Each package provides a scope and sequence of activities which have been divided according to grade level and as to level of difficulty.

Although it is hoped that teachers will adhere to the types of activities felt appropriate for each grade level, it is desirable for teachers to select topics and activities best suited to their students. Introductory activities are intended for students new to computer use whereas those designated as expansion or proficiency are at higher levels of difficulty. The order of activities may easily be altered and the teacher is encouraged to incorporate computer activities/ideas into the remainder of the curriculum or to provide enrichment through computer clubs, etc. Many of the curriculum objectives outlined in this document can be accomplished without using a computer. However, hands-on activities are highly recommended to provide concrete experiences and to increase motivation.

TIME ALLOTMENT

The K-9 Computer Awareness package has been prepared as a series of units which may be taught using either an integrated or discrete approach. These units have been developed for the following teaching times:

K-3	10-15 hours per year
4-6	15-20 hours per year
7-9	20-25 hours per year

ACTIVITIES

Each Computer Awareness package contains a series of objectives and activities. These objectives/activities have been coded as follows:

Example: II-4-2
Level 2
Introduction

"II-4-6" indicates that the activity is part of Unit II, goes with objective 4 and is the sixth activity for that objective.

"Level 2" refers to the second grade level for that particular package. For example, in the 4-6 document Level 2 refers to grade 5 but during the initial implementation of the program, it may be thought of as the second year of exposure to the concept(s) under consideration.

Terms such as "introduction," "expansion," or "proficiency" included with an activity/objective indicate the desired level of student knowledge or mastery thought necessary.

SCOPE AND SEQUENCE

	Level 1	Level 2	Level 3
I. GETTING STARTED			
1. to explain and to show how to switch on a microcomputer	Proficiency		
2. to explain and to show how to care for a computer and its peripherals	Proficiency		
3. to demonstrate simple trouble-shooting techniques	Introduction	Expansion	Proficiency
4. to demonstrate the use of the "immediate" mode	Introduction	Expansion	Proficiency
II. WHAT IS A COMPUTER?			
1. to identify the 5 major components of the computer and to explain the basic operations of each of these components		Introduction	Expansion
2. to describe the terms "hardware", "software," and to give examples of each	Introduction	Proficiency	
3. to recognize that a computer gets instructions from a program written by a person	Introduction	Expansion	
4. to recognize that computers are best suited to tasks requiring speed, accuracy, repeated operations, and the processing of large quantities of data		Introduction	Expansion
5. to identify similarities and differences among computers, calculators, and electronic games	Introduction	Proficiency	
6. to recognize that people control what computers do	Introduction	Expansion	
7. to use prepared programs in a computer	Introduction	Expansion	

	Level 1	Level 2	Level 3
III. HOW COMPUTERS HAVE DEVELOPED			
1. to identify and to describe early devices which led to the development of the first computers			Introduction
2. to be exposed to the four generations of computer development			Introduction
3. to describe possible futures of computers based upon recent developments and trends			Introduction
IV. HOW TO MAKE COMPUTERS WORK FOR YOU			
1. to order specific steps in a procedure which accomplishes a task without the use of a computer	Introduction	Expansion	Expansion
2. to understand that in order to communicate with a computer, a language it understands must be used	Introduction	Expansion	Expansion
3. to recognize that computers may understand several computer languages		Introduction	Expansion
4. to develop a procedure/program which enables the computer to accomplish a task	Introduction	Expansion	Proficiency
V. COMPUTERS IN OUR LIVES			
1. to recognize the use of integrated circuits (micro-chips) a) in the home b) in the community c) in recreation	Introduction	Expansion	Proficiency
2. to identify capabilities of the computer which have made it important in today's society			Introduction
3. to become aware of the limitations of computers			Introduction
4. to describe similarities and differences between computers in fiction and computers in reality		Introduction	Expansion

UNIT 1. Getting Started

This topic is intended to help students become familiar with the procedure needed for getting the computer up and running in a classroom or school. Do's and don'ts with respect to care, maintenance and organization are emphasized. A first "hands-on" experience with the computer is suggested.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
The student should be able:		
1. to explain and to show how to switch on a microcomputer; (Level 1-Proficiency)	See appropriate manual for cable connections and position of ON/OFF switch(es).	I-1-1 I-1-2
2. to explain and to show how to care for a computer and its peripherals; (Level 1-Proficiency)	"Peripherals" refers to anything connected to the microcomputer by wire or cable. For example, cassette drive, disk drive, printer, etc. If the system (computer and accessories) is mobile, establish a procedure for moving which will ensure minimal risk of damage. Having the system permanently fixed on a mobile table or cart is recommended. See I-2-1 on care of disks. Many of the DO's and DON'Ts also apply to cassette (I-2-3) tapes and machines. Insure that all connections are secure against pulling or bending. The pins and connectors are easily damaged. Establish "house rules" that will ensure safety and respect for the entire microcomputer system.	I-2-1 I-2-2 I-2-3 I-2-4 I-2-5 I-2-6

Suggestions for Classroom Rules

I. Computer and Materials

1. While the machine is on, the disk drive door must be closed.
2. While the disk drive light is on, the keyboard must not be touched.
3. The computer is not a toy and must be used in a responsible manner.

OBJECTIVES | NOTES AND EXPLANATION | ACTIVITIES

4. Disks are sensitive to dust, food, and bending; "fragile" and must be handled with care.
5. Foreign substances such as food, dirt, etc., must be kept away from the machine and its various parts.

II. Computer Manners

1. Have respect for another individual's computer time.
2. Be patient for teacher time if a problem arises while working on the computer.
3. Movement to and from the computer should take place with as little disruption as possible.
4. If instructions or assignments are missed while working on the computer, you are still responsible for them, so ask a friend for help.

3. to demonstrate simple trouble shooting techniques;
(Level 1-Introduction)
(Level 2-Expansion)
(Level 3-Proficiency)

Trouble shooting techniques are the procedures to follow if trouble is encountered in the operation of the microcomputer system. At Level 1, show students how to check the power cord and ON/OFF switch. If a TV is used check that it is on and turned to the appropriate channel (see computer manual). At Level 2, familiarize students with the trouble shooting section of the appropriate manual. If all appears correct and the system still will not function call a resource person.

4. to demonstrate the use of the "immediate" mode.
(Level 1-Introduction)
(Level 2-Expansion)
(Level 3-Proficiency)

All Commodore and TRS-80 Model I computers are in "immediate mode" when turned on. For Apple II and TRS-80 Model III machines, follow the directions given below:

I-4-4

Apple II

1. Open the disk drive door.
2. Turn on the monitor.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	3. Turn on the computer. 4. Hold down the CTRL key and press RESET (this stops the disk drive from spinning).	
	Radio Shack Model III (TRS-80)	
	1. Hold down the "break" key. Switch on the computer. 2. When "CASS" appears on the screen, hit "enter." 3. Continue pressing the "enter" key until the "ready" signal appears.	
	Show students how to write on the screen using the keyboard. Use the microcomputer as a visual typewriter and as a calculator (NOTE: the computer is pre-set to follow established order of operations). Demonstrate the function of the special keys (graphics, cursor movement keys, etc.). See manuals for your model/make. "Immediate" mode involves direct use of the computer. For example, using print statements without line #'s.	I-4-1 I-4-2 I-4-3
	To demonstrate the use of the computer as a calculator, simply type "PRINT" followed by the arithmetic question. (Do not follow the question with an equal. Example: Type "Print 2 + 3 and press return/enter key. The computer will respond with "5".	
	Following completion of Unit I at Level 1, have the students respond to activity I-4-4.	

UNIT II. WHAT IS A COMPUTER?

This topic concentrates on the computer: what it is and how it works. Computer components and processes will be introduced and internalized through a variety of concrete activities, most of which do not require a computer. Modern calculators, electronic games and toys will be compared and contrasted to the computer. The students will develop an appreciation for the capabilities and limitations of the computer.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
The student should be able:		
1. to identify the 5 major components of the computer and to explain the basic operations of each of these components; (Level 2-Introduction) (Level 3-Expansion)	By "Components" we refer to Input, Central Processing Unit (C.P.U.) and Output. The C.P.U. is made up of Control, Memory, and Arithmetic/Logic Unit. CONTROL LOGIC/ ARITHMETIC INPUT MEMORY OUTPUT Input devices are those which allow data to be entered into the computer. For example, keyboard, card reader, paper tape reader, light pen, disk drive, and cassette drive. The C.P.U. is where data is processed according to instructions given with the data. The resulting processed data may be displayed or saved on one or more of the following OUTPUT devices: printer (hard copy on paper), C.R.T. (cathode-ray tube) or screen, audio unit (speaker), disk drive, and cassette recorder.	II-1-1 II-1-2 II-1-3 II-1-4

Suggestions for Sample Lessons on Input, Processing, Output

1. The teacher could sharpen a broken pencil and discuss the sequence of events in relation to input, processing, and output.

2. On the chalkboard, provide examples of input and processing. Have the children supply examples of output.

e.g.

Input	Processing	Output
Dirty Teeth	brushing	
Kool-Aid	freezing	
Paper	painting	

3. On the chalkboard, provide examples of input and output. Have the children supply examples of processing.

e.g.

Input	Processing	Output
Dirty Teeth		Clean Teeth

4. On the chalkboard, provide examples of processing, and output. Have the children supply examples of input.

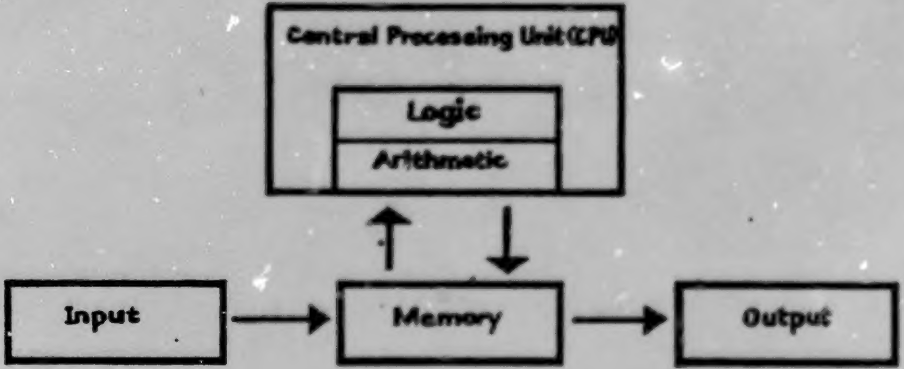
e.g.

Input	Processing	Output
	brushing	Clean Teeth

Tell students briefly how the computer works.

The computer receives information or input through the keyboard, a cassette, a disk, or other input device. This information is sent to a memory location, which passes the information to the CPU (central processing unit). The CPU decides if it is an arithmetic or logic problem and sends it to the appropriate part for

II-1-5

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	processing. The CPU collects the results and gives them to a different memory location. This memory location then gives the answer to the output, which then displays it on a monitor, TV screen, printer, or other output device.  Central Processing Unit (CPU) Logic Arithmetic Input Memory Output	
2. to describe the terms "hardware", "software", and to give examples of each; (Level 1-Introduction) (Level 2-Proficiency)	Hardware refers to "the computer and all of its associated devices." Software refers only to the programs which may be saved on such hardware as cassette, floppy disk, reel tape, computer cards, or punched tapes. Collect information and pictures of computer hardware from magazines, newspapers, and pamphlets. Make a collage of various computer components incorporating the names of each.	II-2-1 II-2-2

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
3. to recognize that a computer gets instructions from a program written by a person; (Level 1-Introduction) (Level 2-Expansion)	A program is a numbered ordered series of instructions to the computer. Any of the prepared software that you may have is comprised of programs that may be loaded into your computer.	
4. to recognize that computers are best suited to tasks requiring speed, accuracy, repeated operations, and the processing of large quantities of data; (Level 2-Introduction) (Level 3-Expansion)	The "Computer Statistics Sheet" - Activity II-4-2 - should be considered for class discussion at level 2 and the activity following the article should be reserved for level 3 students.	II-4-1 II-4-2

Activities

1. Contest: Computer vs. Children

Set up a series of events in which the children will match their brains against the computer.

NOTE: Remember to type NEW prior to typing each computer program.

a. Speed:

Print the numbers from one to 100. After the children have been given instructions and the computer has been programmed, say "go."

Computer Program

```
5 HOME (Apple)   5 CLS (Radio Shack)   5 PRINT "■" (PET/VIC)
10 FOR X=0 to 99
20 PRINT X + 1
30 NEXT X
40 END
RUN
```

NOTE: The "clear screen" command on Commodore machines is achieved by holding down the SHIFT key and pressing the CLR/HOME key.

b. Accuracy:

Write 8375*9623 on the chalkboard. After the question has been presented on the board, ask the children to solve the problem. Now put the problem in the computer and run. Compare the accuracy of responses.

Computer Program

```
Print 8375*9623
```

c. Repeated operations:

Ask the children to write the line "I will not chew gum in school", 100 times. Write a computer program for this line.

Computer Program

```
5 HOME (Apple)   5 CLS (Radio Shack)   5 PRINT "♥" (PET/VIC)
10 for I = 1 to 100
20 PRINT "I WILL NOT CHEW GUM IN SCHOOL"
25 PRINT
30 NEXT I
40 END
RUN
```

d. Processing large amounts of data:

Write the following sequence of numbers on the chalkboard:

7 2 3 1 6 9 0 4 7 2 1 5 3 6

Ask the children to memorize it while you write the computer program:

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES

Computer Program

```
NEW
5 HOME (Apple)    5 CLS (Radio Shack)    5 PRINT "♥" (PET/VIC)
10 PRINT "7 2 3 1 6 9 0 4 7 2 1 5 3 6"
20 END
SAVE NUMBERS
RUN
```

Erase the numbers from the chalkboard and have the children write the sequence.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
5. to identify similarities and differences among computers, calculators, and electronic games; (Level 1-Introduction) (Level 2-Proficiency)	All major similarities include: keyboards or buttons, visual display, and all employ the silicon chip. Major differences include: memory size (the amount of information that can be stored in the machine) and the number and variety of functions and capabilities available. <u>Activity Suggestions</u> 1. Show pictures of various computers and discuss the kind of tasks they are capable of performing. 2. Have students experiment with various tasks on the computer and the calculator. Discuss similarities and differences between the two machines. 3. Display available electronic games. Provide students with the opportunity to work with them. Discuss similarities and differences between these games and computers.	II-5-1 II-5-2 II-5-3
6. to recognize that people control what computers do; (Level 1-Introduction) (Level 2-Expansion)	Computers cannot "think" in the way people normally use the word. Computers cannot make value judgements or provide answers to every question.	II-6-1 II-6-2 II-6-3 II-6-4 II-6-5

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	Computers are not capable of thinking in the same way people think. Thinking involves many processes which machines cannot perform.	
	Suggestions 1. Read a dictionary definition of "think." 2. Discuss the definition and identify kinds of thinking. 3. Take the list formulated in 2 and determine if computers are capable of performing these kinds of thinking.	
7. to use prepared programs in a computer. (Level 1-Introduction) (Level 2-Expansion)	Encourage maximum "hands-on" activities through computer assisted learning programs and computer games. To change programs: PET/VIC - press RUN/STOP key. Rewind tape, remove cassette and replace with desired program. With disk wait until error light is off, remove and replace disk. TRS-80 - press BREAK key to stop program and then follow procedure as above. Apple II - see activity II-7-1.	II-7-1

III. HOW COMPUTERS HAVE DEVELOPED.

This topic is intended to expose students to the development of calculation aids from finger calculators to computers. Emphasis is placed on the increase in complexity and capacity of calculation aids but not on formal history. Discussion of this topic is more appropriate at the upper intermediate grade levels but actual experiences with the various devices are appropriate at all levels. It is recommended that students be provided with "hands-on" experience with devices such as abacuses, mechanical calculators, electronic calculators, and electronic learning aids as well as microcomputers.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
The student should be able:		
1. to identify and to describe early devices which led to the development of the first computers; (Level 3-Introduction)	Major stages are listed below. Choose topics that best meet your student's needs. The key concept is that the devices were progressively improving in speed and capability. In historical order they are: - abacus - 2000 B.C. - finger calculation - Stonehenge - 1800 B.C. - Napier's Bones - 1640 A.D. - First calculating machine, Blaise Pascal - 1647 - First use of punched cards for selection, Joseph Marie Jacquard - 1775 - Difference Engine - mechanically produce logarithmic tables, Charles Babbage - 1812 - Analytical Engine - all components of a modern computer including memory, control, arithmetic/logic unit, and input/output capabilities, Charles Babbage - 1833 - Lady Lovelace "the first programmer" - First cash register, James Ritty - 1878 - First adding machine to record entries on paper and running totals, William S. Borroughs and Thomas Metcalfe - 1880 - Hollerith's sorter - improved on punch card system, used electrical contacts to sense holes and provided a method of sorting, Herman Hollerith - 1880	III-1-1 III-1-2 III-1-3 III-1-4

Suggestions for activities include:

1. Design a timeline depicting the major advances of computers since 1940.

2. Examine editions of old magazines, newspapers, catalogues or reference books to locate pictures, advertisements or articles relating to computers of the past.

3. STARTING IN THE LIBRARY - Good subjects for report writing or presentations.

   Napier
   Maheim
   Sholes
   Jacquard
   Powers
   Abacus
   Pascal
   Babbage
   Remmington
   Burroughs
   T. J. Watson
   ENIAC
   Baldwin
   Gutenburg
   Underwood
   Hollerith
   Mark 1

4. Show the generations of computers in a bulletin-board display. Cover a large area with brown roll paper and label it "FIRST GENERATION." Tape other rectangles of colored paper on top to show the second, third, and fourth generations. Find out the relative costs of each generation and label the rectangles.

2. to be exposed to the four generations of computer development; (Level 3-Introduction)

The notes provided below may be treated as enrichment. Stress however, the key concept of increasing capabilities through time.

First Generation of Computers (1950-1959)

a) based upon vacuum tube design.
b) gigantic size relative to performance capabilities.
c) speeds were measured in the millisecond range.
d) developed enormous amounts of heat; required large air conditioning units.
e) consumed a great deal of electrical energy.
f) notoriously unreliable.
g) programmed in machine language.

Second Generation of Computers (1960-1965)

a) based upon transistor design.
b) physically smaller than predecessors.
c) speeds were measured in the microsecond range.
d) used a magnetic core for storage.
e) larger storage capacity which permitted the use of more input and output devices.
f) programming was done in symbolic languages.

Third Generation of Computers (1965-1975)

a) based upon solid state technology, or integrated circuit design.
b) speeds were measured in the nanosecond range.
c) consumed considerably less electrical energy.
d) cooler operating.
e) main storage technology changed; core replaced by plated wire, thin film and monlithic storage.
f) multi-programming (several programs executing simultaneously) became possible.
g) on-line systems made possible the accessing of the computer from remote locations.
h) computer languages improved; more sophisticated for the professional, more simplified for the casual user.

Fourth Generation of Computers (1975-????)

a) based upon microelectronic technology; the microchip.
b) places into hardware what formerly was in program code in software.
c) has performance improvements of several orders of magnitude.
d) allows main storage to be expanded to millions of characters by utilizing direct access storage as an extension of main storage.
e) allowed for the development of mini and micro.
f) the virtual machine concept lets a single computer function as several different computers simultaneously.
g) has made computers and software available at low cost.
h) development of Silicon Valley.

3. to describe possible futures of computers based upon recent developments and trends. (Level 3-Introduction)

Activity suggestions include:

1. Design and create a city of the future. Describe means of transportation, communication, education, entertainment, etc., in your city. III-3-1
2. Write a brief autobiography of your life in the year 2020. Assume that you are the same age as you are now.
3. Design a computer that will do a chore that you do not like to do.
4. Design a model computer. Describe how your computer works. Include input, processing, and output. Would you consider your computer to be real or functional?
5. Read the book Robots in the Fact and Fiction by Melvin Berger (or some other book on robots).
6. Describe the difference between a real robot and a fictional robot.
7. Compare a famous robot such as R2D2 in "Star Wars" to a real robot or computer.

OBJECTIVES NOTES AND EXPLANATION ACTIVITIES

8. If advancements in computer technology continue to grow at such a fast rate, what do you think "Miniac" might look like and what might it be capable of doing in the year 1999? Compare your predictions with a friend working on this same task.

9. Read the article "You and Your Home Computer" to students. Discuss the future described in this scenario. Add to the collection of paper strips showing the uses of computers.

Make a use-tasks chart.
What new jobs might exist in the future?
What old jobs will be obsolete?
How will some leisure time be spent?

10. Future children may spend so much time with "thinking machines" (games, recreational reading, news, school, research, T.V., telephone calls, movies, and 3D-TV) that their bodies suffer badly from a lack of exercise. The task is to create games and/or equipment and/or fun experiences, etc., which will encourage kids and/or adults to exercise every day.

IV. HOW TO MAKE COMPUTERS WORK FOR YOU

The main purpose of this section is to instill the basic understanding that people make computers work. The beginning activities do not require a microcomputer and are designed to develop logical, sequential thinking by examining everyday activities (a skill necessary to create a computer program). Where equipment is available, students can create computer programs using modern computer languages. Several activities and resources are provided, which will simplify the process and enthuse or motivate the learner.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
The student should be able:		
1. to order specific steps in a procedure which accomplishes a task without the use of a computer; (Level 1-Introduction) (Level 2-Expansion) (Level 3-Expansion)	Sequencing step-by-step procedures involving logical and sequential thinking are fundamental to problem solving. This sequencing should be dealt with both informally and formally.	
	Simple problem solving such as writing directions or sequencing daily events are to be encouraged and practiced informally by first ordering specific steps in a procedure and then testing the procedure to find possible errors.	IV-1-1 IV-1-2 IV-1-3 IV-1-4 IV-1-5
	If LOGO is chosen as a programming language for this unit, then Activity IV-1-1 is recommended at this time.	
	Flowcharts are a more formal framework which can be used to organize the steps in the procedures developed previously.	
	Students can also flowchart the solution to more complex imaginary problems at level 3.	
	Some examples of procedures to flowchart at level 1 and 2 are: - how to bake a cake - making a triple decker ice-cream cone - going to school - counting from one to a hundred	

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	- greeting your aunt with a kiss and your uncle with a handshake - cleaning your room - mowing the lawn - setting the table - scaring your mom with a . . . - making a hand puppet - how to climb a tree - how to make toast	
	More complex level 3 procedures could involve such things as:	
	- writing direction for how to build a chair - how to get from your home to school - how to buy a pair of jeans - rules for a game	
	Any procedures involving YES/NO decisions or choices could be used to demonstrate/assign step-by-step sequencing.	
2. to understand that in order to communicate with a computer, a language it understands must be used; (Level 1-Introduction) (Level 2-Expansion) (Level 3-Expansion)	Just as people need to speak using words in a certain syntax to communicate with other people, people also need to use a computer language and its correct syntax to communicate with a computer.	
	Level 2 and 3 students could type the USBORNE series Spacegames and Battlegames programs into the computer and then use the games which have been created. These books offer many simple and short games which have been modified for use on TRS-80, VIC-20, Pet, and Apple microcomputers.	IV-2-1
3. to recognize that computers may understand several computer languages; (Level 2-Introduction) (Level 3-Expansion)	Several computer languages in common use include: - LOGO - an intractive procedural language which provides a computer learning environment that the user controls.	

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	- BASIC - an acronym for Beginners All-purpose Symbolic Instruction Code - a common microcomputer language which uses common English key words. Sample BASIC programs can be seen and typed in by Level 2 and 3 students as mentioned above (USBORNE Series). - FORTRAN (Formula Translator) - a language developed especially for scientific and mathematical problems. - COBOL (COmmon Business Oriented Language) - a language developed for business use. - Machine language - the language which the computer understands and uses to operate with. It requires no internal translation by the computer like BASIC or other high level languages. Programs in machine language run much more quickly than higher level language programs because they require no translation by the computer. Machine language need only be presented at Level 3 as an extension item for those students who show an interest in the area. User manuals will need to be consulted for micro processor maps and codes.	
4. to develop a procedure/ program which enables the computer to accomplish a task. (Level 1-Introduction) (Level 2-Expansion) (Level 3-Proficiency)	Students can now apply the problem solving skills developed in objective #1, choose a language introduced in objective #3, and create simple computer programs. The following languages are suggested and activities are provided for each: I LOGO or some LOGO-like language II BASIC It is suggested that this section be developed over several lessons in which students gradually learn the commands needed to accomplish the task at hand. This allows students to internalize that which is new for them. Teachers can select either LOGO or BASIC or a combination of both for work with students. The notes will discuss both areas separately.	

I. LOGO or LOGO-Like Language

LOGO has been suggested as a programming language because it offers the unique possibility for children to control their computer environment. In doing so, it provides an excellent beginning computer experience for children.

Developing a rich culture of LOGO experiences at an early stage in programming will allow students to continue to use LOGO successfully and productively through secondary school and even at the college level.

The "turtle geometry" feature of LOGO is that which will be discussed in the 4-6 part of this curriculum. Seymour Papert, the creator of LOGO, describes the "turtle" as a kind of "object to think with."

LOGO is available only on certain microcomputers so the teacher is required to check for the availability of LOGO on the microcomputer in their school. Several LOGO-like languages such as NIBBLE LOGO (for the Apple), KIDSTUFF (for the Pet), and TuRtleS (for the TRS-80) are available.

The following guidelines are suggested for the three levels:

At the intermediate level (4-6), students using LOGO should be encouraged to plan what they want to program the turtle to do. They should first map out or draw what they want the turtle to do and then think of the steps needed to do this. This approach will then stimulate students to investigate the turtle's "ability" so that accurate program planning can occur. Once plans have been made then the turtle journey can begin on the computer.

Three highly recommended references:
1. Abelson, Harold. Logo for the Apple II.
2. Watt, Daniel. Learning with Logo, McGraw-Hill Book Company.
3. Papert, Seymour, Mindstorms.

OBJECTIVES | NOTES AND EXPLANATION | ACTIVITIES

Activity Package IV-4-11 is a 5-lesson beginning LOGO unit. It was originally taught by Level 3 Proficiency students serving as proctors for students of grades K-3. Any Level 1 students could benefit from this package and its approach. The approach of this package is one of open-ended discovery. Students are encouraged to create spontaneously at the computer. IV-4-11

(Pre-LOGO activities should have been covered in objective #1.) Level 1 students could be introduced to the following computer commands in LOGO. The abbreviations on the right can be used with most forms of LOGO programs.

These commands work on most forms of LOGO.

FORWARD	FD
BACK	BK
RIGHT	RT
LEFT	LT
PENUP	PU
PENDOWN	PD
HIDETURTLE	HT
SHOWTURTLE	ST
REPEAT	

These commands should be introduced as they are needed in accomplishing the various tasks suggested in the activities.

Students can have fun experimenting and discovering with these preliminary tasks and ample time should be allowed for students to develop their curiosity of ALL that the "turtle" can do using these simple commands. Students should be encouraged to explore the LOGO environment through activities which stimulate thought and which allow creativity on the part of the user. IV-4-1 IV-4-2

For example, if a child wished to draw a square he/she would type:

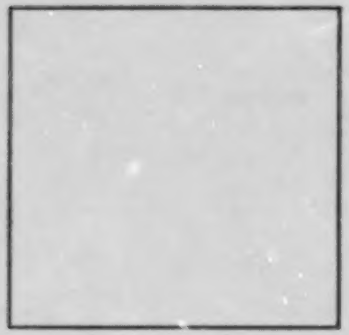
```
FORWARD    60
RIGHT      90
FORWARD    60
RIGHT      90
FORWARD    60
RIGHT      90
FORWARD    60
```

By changing the number of steps forward the size of the square would change.

Just as learning to read or speak a language requires the development IV-4-3
of a rich vocabulary, LOGO language development can be fostered through IV-4-4
the development of a rich culture in turtle graphics.

Level 2 students could begin to use the simple commands to create LOGO procedures. An example of a procedure in LOGO would be the following.

Here is a square procedure.



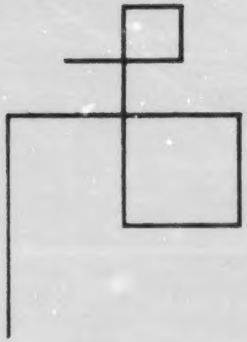
```
TO SQUARE

FORWARD  60
RIGHT    90
FORWARD  60
RIGHT    90
FORWARD  60
RIGHT    90
FORWARD  60

      OR

TO SQUARE
REPEAT 4 (FORWARD 60 RIGHT 90)
END
```

52

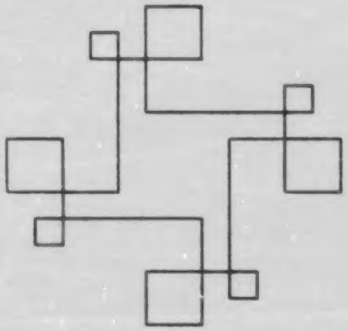
53

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	The student can now use SQUARE to create another design on the screen. The SQUARE can be placed anywhere any number of times upon demand by simply typing in the correct LOGO command followed by the name SQUARE.	IV-4-5
	If appropriate equipment is available, students could save their procedures and use them at a later time.	
	Activity cards with sample shapes could be posted to stimulate students' imaginations for other creations. Students could exchange shapes and try to write the procedures to create them.	IV-4-6
	Students can create procedures and use them to create new ones.	

Here's an example that begins by defining a shape and uses it to make a more interesting shape.



```
TO SHAPE
FORWARD 40
RIGHT 90
FORWARD 40
RIGHT 90
FORWARD 20
RIGHT 90
FORWARD 20
RIGHT 90
FORWARD 40
RIGHT 90
FORWARD 10
RIGHT 90
FORWARD 10
RIGHT 90
FORWARD 20
END
```

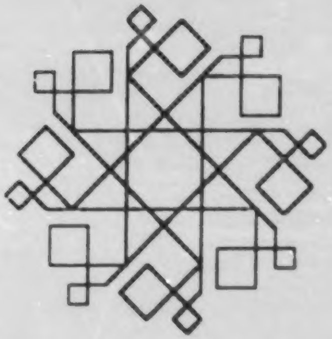


```
TO SHAPE4
SHAPE
SHAPE
SHAPE
SHAPE
END
```

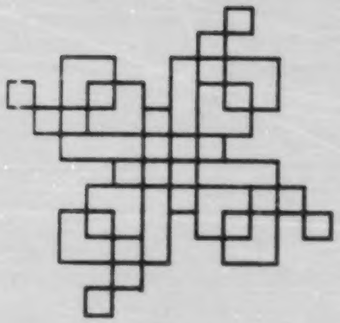
or

```
TO SHAPE4
REPEAT 4 [SHAPE]
END
```

And two more shapes.



```
TO CRYSTAL
SHAPE
LEFT 45
FORWARD 70
CRYSTAL
END
```



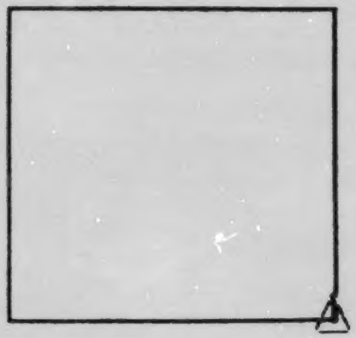
```
TO JENGU
SHAPE
SHAPE
LEFT 90
JENGU
END
```

Editing procedures specific to the type of LOGO used will need to be covered so that modifications can be made to procedures.

Level 3

IV-4-7

Here are two square procedures designed to allow variable size. The dark arrows show the turtle's initial position.



```
TO LSQUARE :SIZE
FORWARD :SIZE
LEFT 90
FORWARD :SIZE
LEFT 90
FORWARD :SIZE
LEFT 90
FORWARD :SIZE
LEFT 90
END
```

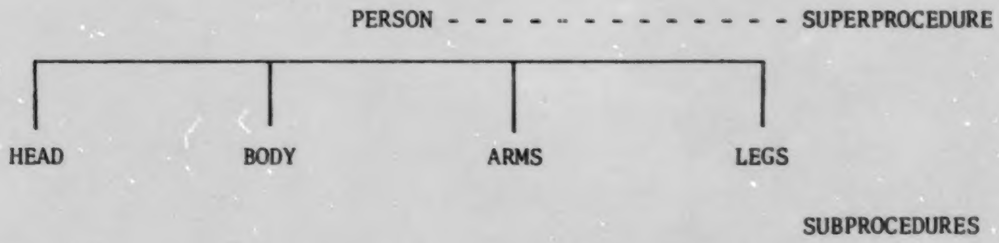
or

```
TO LSQUARE :SIZE
REPEAT 4 [FORWARD :SIZE LEFT 90]
END
```

Students could write a program using procedures together to create a more elaborate design and drawings.

IV-4-8

Here is the procedure tree for the example in Activity IV-4-8. Procedure trees are a good advance organizer for LOGO programming.



Students can modify existing programs.

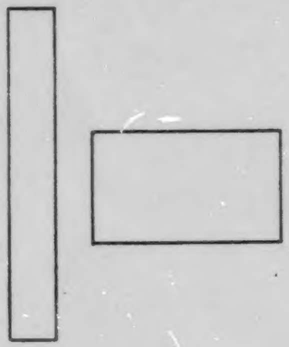
Simple activity cards with ideas for program ideas could be used.

See Chapter 5, Turtle Projects 1: Designs, Learning with LOGO.

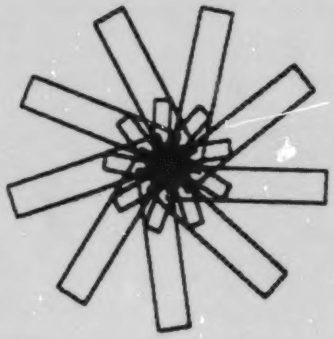
See Chapter 3, Projects in Turtle Geometry, Logo for the Apple II.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	The concept of recursion could be introduced at Level 3.	IV-4-9

A rectangle procedure designed to allow variable size and some examples that use it.



```
TO RECTANGLE :LENGTH :WIDTH
FORWARD :LENGTH
RIGHT 90
FORWARD :WIDTH
RIGHT 90
FORWARD :LENGTH
RIGHT 90
FORWARD :WIDTH
RIGHT 90
END
```



```
TO FLOWER
RECTANGLE 100 20
RIGHT 20
RECTANGLE 10 40
RIGHT 20
FLOWER
END
```

Activity IV-4-10 is the documentation and coding for a game called TURTLE RACE.

IV-4-10

In this game the user drives the turtle around a circular race track using the commands (F)orward, (R)ight, (L)eft, (S)top.

This program could be typed in by a teacher for students to use at Level 1 or it could be left for a Level 3 student to type in.

The program demonstrates many advanced concepts of LOGO programming in addition to those described in this unit.

The game has been written with Terrapin LOGO and modifications are needed if other LOGO systems are in use. For reference see Learning with Logo (Appendix).

II. BASIC

If BASIC is selected as a programming language the following guidelines offer a suggestion for programming at the three levels.

Level 1 - Students can have a great deal of enjoyment and can also learn organizational skills and debugging skills necessary for further programming by creating pictures or graphics. This can be accomplished using a minimal number of commands.

If colour graphics are available students can enjoy the benefit of this feature and can learn the commands necessary for the creation of colour on the screen.

For those students without colour equally as much fun could be had creating graphics with only the PRINT statement and the existing character set offered by the computer's keyboard.

IV-4-12

Activity package IV-4-24 "Getting to Know our Apple Microcomputer" is a 5-6 lesson package which introduces the PRINT statement and low resolution graphics. It is suggested for use at Level 1 and was designed for use on the APPLE microcomputer. This package was designed to be taught to students at the grade 4-6 level by Level 3 Proficiency proctors.

IV-4-24

OBJECTIVES | NOTES AND EXPLANATION | ACTIVITIES

It is suggested that the activities be expanded and modified for use at more advanced levels. Many activities listed at Level 1 could easily be modified for use again at Levels 2 and 3.

There are many other activities which can be chosen to demonstrate the PRINT statement.

IV-4-13
IV-4-14
IV-4-15

The concept of FOR, NEXT loops can be best introduced as timing loops. The following programs show how these can be used on a PET. Students should be encouraged to change the values in the loops to see the results. Students could actually time the loops with a stop watch and use the actual times to calculate other FOR, NEXT values.

PROGRAM #1

```
10 PRINT"♥"
20 FOR X=1 TO 300:NEXT
30 PRINT"HI THERE"
40 FOR X=1 TO 300:NEXT
50 GOTO 10
```

PROGRAM #2

```
10 PRINT"♥"
20 FOR X=1 TO 300:NEXT
30 PRINT"HI THERE"
40 FOR X=1 TO 300:NEXT
42 PRINT"♥"
44 PRINT"your name"
46 FOR X=1  TO 300:NEXT X
50 GOTO 10
```

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	Students can combine the PRINT and FOR, NEXT statements to animate their graphics. Students should type in the three program samples in activity IV-4-16 and then try to generate their own animated graphics. These could be saved for use at a later time.	IV-4-16
	The FOR, NEXT loop has more powerful applications in BASIC programming. It can be used to repeat an operation or operations within the loop a given number of times.	IV-4-17
	PRINT statements combined with INPUT statements provide for a more highly interactive means of programming.	IV-4-18 IV-4-19
	Level 3 students may wish to add sound to their animation. Activity IV-4-20 describes sound generation on the PET.	IV-4-20
	At Level 3, variables may be introduced for more advanced problem solving.	IV-4-21 IV-4-22
	Level 3 students could be encouraged to incorporate all statements necessary in the creation of their own graphics game.	
	Activity IV-4-23 offers a sample listing of a graphics program which could be typed in by students and modified. It could help students by serving as a model or a beginning of graphics programming.	IV-4-23
	This program has been designed foruse on the VIC-20.	

V. COMPUTERS IN OUR LIVES

Computers are affecting us daily in all aspects of our lives. This topic is intended to have the student investigate his/her home, school and community environment. A wide variety of techniques is suggested to ensure maximum involvement of the student. Students will be asked to brainstorm, discuss, role play, visit, invite speakers, and question.

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
The student should be able:		
1. to recognize the use of integrated circuits (micro-chips): (Level 1-Introduction) (Level 2-Expansion) (Level 3-Proficiency)	Integrated circuits or micro-chips are the primary components of computers and are encountered in many facets of daily life. Any classroom activity which promotes a greater awareness of the extent of the use of micro-chips in our lives should be encouraged. Brainstorming activities, class discussion, field trips, guest speakers, art collages, posters are only a few ways a teacher could inspire such awareness.	V-1(a)-1
a) in the home,	Micro-chips are found in common home appliances such as microwave ovens, T.V.'s, stereo equipment, clock radios, etc. Also, they are found in automobiles. A suggested activity follows: - List five jobs done in your home by a machine, that 20 years ago were done by people. - Pick one of these jobs and compare the old way and new way using at least five criteria. - List five jobs still done by people, around the house. - Pick one you would like to see done by a machine. - List several traits of this machine. - List several problems people would have with it.	

- List several improvements for these problems.
- Draw and describe your new machine. Tell what role(s) a ___________________ would have in this machine.
- Make up a T.V. ad for your machine and present it to the class as a one minute commercial.

b) in the community,

Computer generated materials such as telephone or hydro bills, form letters, or bank statements can be found in daily mail.

Many services and businesses such as banks, public utilities, grocery stores, newspapers, hospitals, law enforcement, and schools, use computers in their operation.

Business and industrial organizations such as manufacturing or form equipment services could be explored to see how computer technology is used.

Micro-chips have accelerated development in the field of communication.

Consider the following activity or suggestions:

V-1(b)-1
V-1(b)-2
V-1(b)-3
V-1(b)-4
V-1(b)-5

- Investigate the way in which computers are currently being used in the following areas:

  medicine and health care
  education and training
  business and banking
  transportation-traffic control
  weather bureau
  government and politics
  the library
  publishing/printing
  handicapped
  space travel
  farm equipment
  fire hall
  law enforcement
  engineering and design
  the office
  defence systems
  stores
  resources
  manufacturing
  public utilities
  garment industry
  hotels/motels
  restaurants

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	Propose the following situation to your class:	
	- You are a computer salesperson. You have discovered a business or occupation not presently using computers. Compose a letter trying to convince them that a computer would be of benefit.	
	- You are the manager of a sports team. You feel that computers might aid your team in winning. Convince the owner that a computer should be purchased.	
	- You've just been enrolled in a school which is completely computer oriented. All instruction is given by a computer. Describe what school would be like and discuss the advantages and disadvantages.	
	- Examine the career section of a newspaper. Use a symbol to indicate which career advertisements require computer knowledge. Use a different symbol to indicate those which do not. a) Compare the two groups in terms of numbers. b) Determine the percent of advertised positions requiring computer experience.	V-1(b)-6
c) in recreation;	Students should be aware that recreational accessories such as video games, time clocks, scoreboards, hand-held electric games and sound synthesizers all use micro-chips.	
2. to identify capabilities of the computer which have made it important in today's society; (Level 3-Introduction)	Discuss the following points: - used in all areas of society - 75% of North Americans are said to be occupied in some information manipulating occupation	

OBJECTIVES	NOTES AND EXPLANATION	ACTIVITIES
	- store and retrieve large amounts of information - instant access of information at a distance - cost effective - accurate and fast - do repetitive tasks - assist in education - used for decision making and planning - automatic inventory control - value in research - aid to the handicapped	
3. to become aware of the limitations of computers; (Level 3-Introduction)	Consider that computers: - cannot make value judgements - cannot answer all questions - cannot do certain operations or manipulations either efficiently or effectively	
4. to describe similarities and differences between computers in fiction and computers in reality. (Level 2-Introduction) (Level 3-Expansion)	As has been discussed, in reality there are limits to computer capabilities. In fictional stories, however, there are no limits. Similarities and differences exist between real computers and computers in fiction. The following could be used as a sample lesson: - Students will: 1. List fictional computers. 2. Compare fictional and real computers as to their similarities and differences. 3. Invent their own fictional computer.	V-4-1

OBJECTIVES NOTES AND EXPLANATION ACTIVITIES

Material: 1. Student Sheet - Fictional Computers (V-4-1)

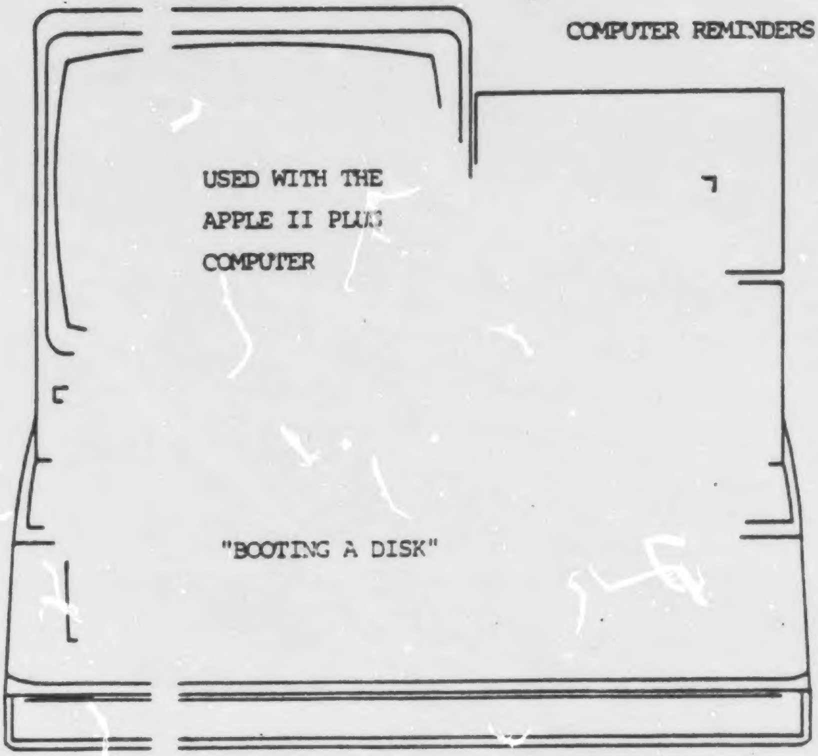
Procedure:

1. With the class, list the titles of familiar books, stories, magazine articles, and movies which contain fictional computers.
2. Have students invent what they consider to be the "perfect" (fictional) computer.

Suggestions:
- Write about it.
- Draw and describe it.
- Construct it out of materials.

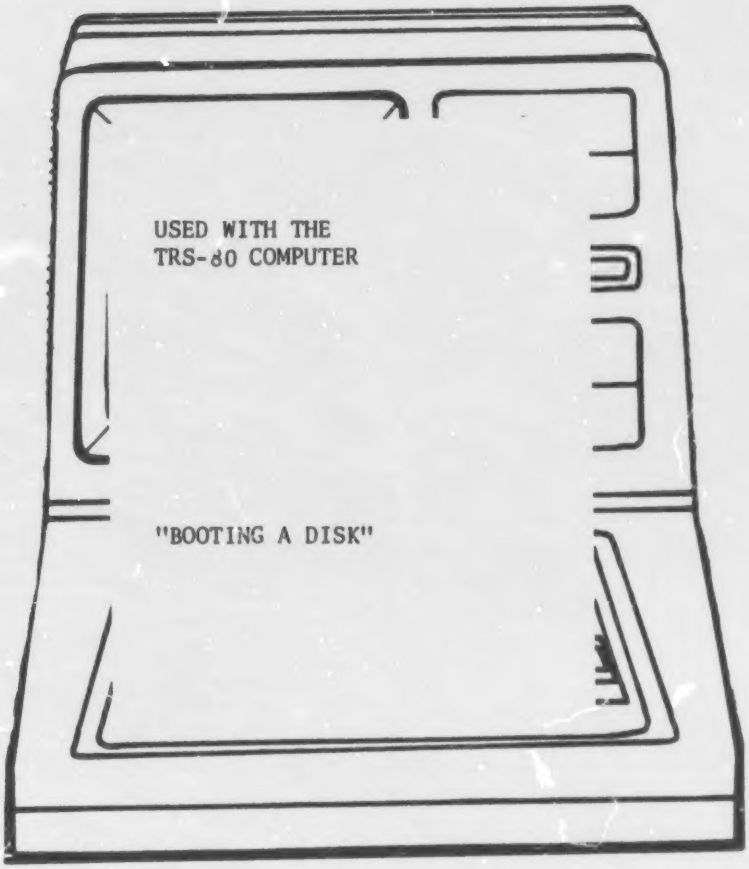
I-1-1
Level 1
Proficiency

COMPUTER REMINDERS



STEPS:

1. Turn on the monitor.
2. Insert disk face up into the disk drive.
3. Close the door on the disk drive.
4. Ground yourself and then turn on the computer.
5. Type CATALOG
6. Press the RETURN key.
7. Select a program.
8. Type LOAD and the program's name.
9. Now press the RETURN key.
10. Type RUN.
11. Press the RETURN key.
12. Remove diskette from disk drive and store in diskette holder.
13. Turn off the monitor.
14. Turn off the computer.

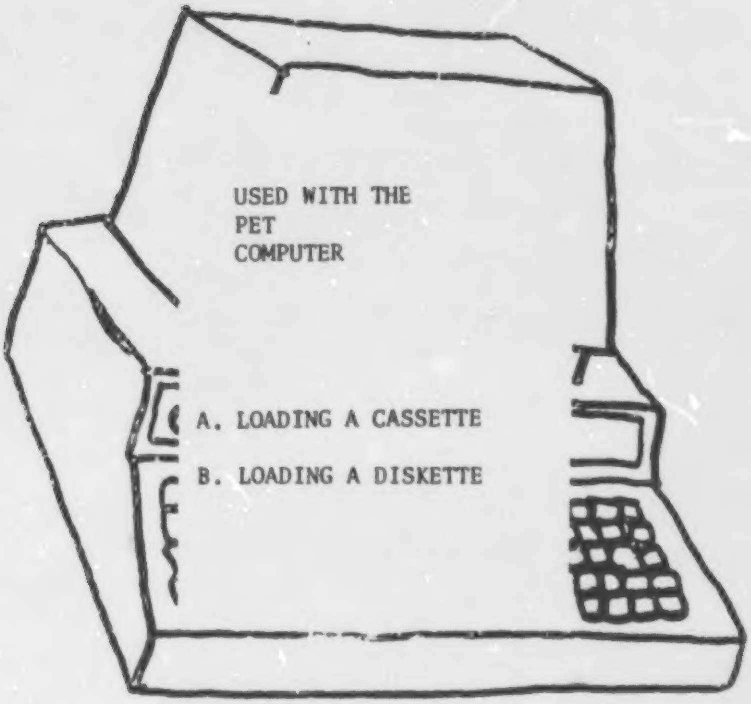


USED WITH THE
TRS-80 COMPUTER

"BOOTING A DISK"

STEPS:

1. Turn on the computer.
2. Insert disk face up into the disk drive. If it's double disk drive put disk in drive 0.
3. Close the door on the disk drive.
4. Press the reset button.
5. Type in date.
6. Press "enter" key.
7. Type basic.
8. Follow instructions on disk package or type RUN "name of program".
9. Press ENTER.
10. Remove diskette from disk drive and store in diskette holder.
11. Turn off the machine.

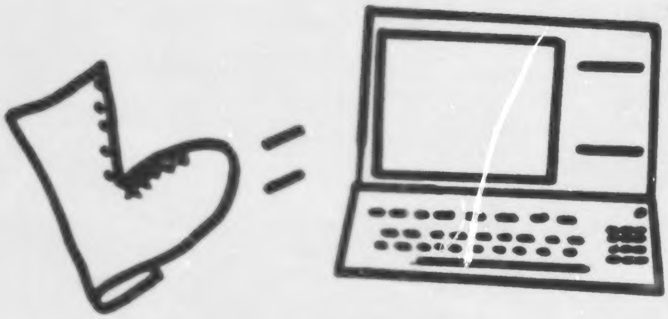


A. STEPS:

1. Turn on computer (switch on back).
2. Insert cassette.
3. Type LOAD or LOAD "name of program".
4. Hit RETURN key.
5. Press PLAY on datasette.
6. When cursor flashes under "READY", byte RUN.
7. When finished, REWIND tape and remove.
8. Turn off computer.

B. STEPS:

1. Turn on computer (switch on back).
2. Turn on disk drive (switch on back).
3. When RED light on drive goes out, insert disk, label up.
4. Close drive door.
5. Type CATALOG.
6. Type DLOAD "name of program".
7. When ready, type RUN.
8. When finished, remove disk before turning off drive or computer.
9. Place disk in storage envelope.



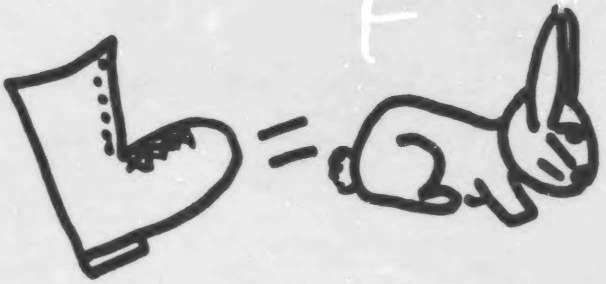
NAME________________________________

DATE________________________________

INSTRUCTION FOR "BOOT THE TRS-80 GAME"

1. Cut out the boxes below.
2. See how long it takes you to put the boxes in order on the game board. (Are you faster than your friend?)
3. Put the boxes in order on the game board. Remove one box. Ask a friend to identify the missing step.
4. Put the boxes in order on the game board. Mix up two steps. Ask a friend to locate the mix-up.

THE RED LIGHT ON THE DISK DRIVE GOES OFF FOR THE FIRST TIME.	CHECK THE PLUG TO SEE THAT IT IS CONNECTED.
OPEN THE DOOR OF THE DISK DRIVE.	SELECT THE PROGRAM YOU WISH TO USE. NOTE THE EXACT SPELLING OF ITS TITLE.
WHEN YOU SEE THE WORDS "TRS-DOS READY" ON THE SCREEN TYPE DIR AND PRESS THE ENTER KEY.	INSERT THE DISKETTE FACE UP INTO THE SLOT IN THE DISK DRIVE.
CLOSE THE DOOR OF THE DISK DRIVE AND PRESS THE ORANGE RESET BUTTON.	PRESS THE ORANGE RESET BUTTON AGAIN.
GROUND YOURSELF AND TURN ON THE POWER SWITCH UNDER THE RIGHT SIDE OF THE KEYBOARD.	TYPE THE NAME OF THE PROGRAM AND PRESS THE ENTER KEY.



NAME________________________________

DATE________________________________

INSTRUCTIONS FOR "BOOT THE PET GAME"

1. Cut out the boxes below.
2. See how long it takes you to put the boxes in order on the game board. (Are you faster than your friend?)
3. Put the boxes in order on the game board. Remove one box. Ask a friend to identify the missing step.
4. Put the boxes in order on the game board. Mix up two steps. Ask a friend to locate the mix-up.

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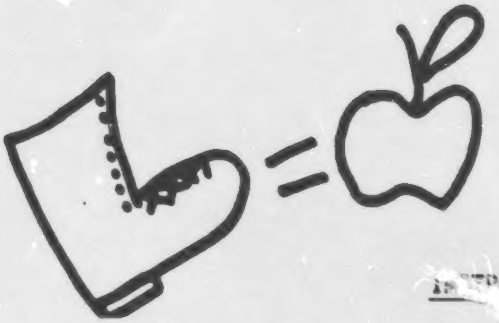
OPEN THE DISK DRIVE DOOR	TURN ON THE PET COMPUTER
PRESS THE SHIFT AND RUN/STOP KEYS AT THE SAME TIME.	CLOSE THE DOOR OF THE DISK DRIVE.
TURN ON THE DISK DRIVE.	INSERT THE DISKETTE FACE UP INTO THE SLOT IN THE DISK DRIVE.



NAME______________________________

DATE______________________________

INSTRUCTIONS FOR "BOOT THE APPLE" GAME

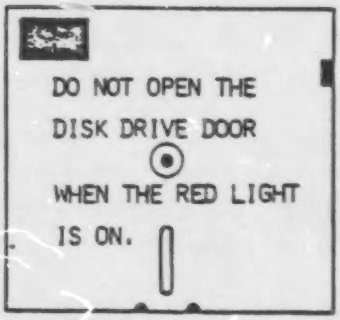
1. Cut out the boxes below.
2. See how long it takes you to put the boxes in order on the game board. (Are you faster than your friend?)
3. Put the boxes in order on the game board. Remove one box. Ask a friend to identify the missing step.
4. Put the boxes in order on the game board. Mix up two steps. Ask a friend to locate the mix-up.

WAIT UNTIL THE RED LIGHT ON THE FRONT OF THE DISKETTE GOES OFF FOR THE FIRST TIME	TURN ON THE MONITOR.
OPEN THE DOOR OF THE DISK DRIVE.	TYPE LOAD AND THE NAME OF THE PROGRAM YOU WISH TO RUN. PRESS THE RETURN KEY.
THE CATALOG WILL APPEAR ON THE SCREEN.	INSERT THE DISKETTE FACE UP INTO THE SLOT IN THE DISK DRIVE.
CLOSE THE DOOR OF THE DISK DRIVE.	TYPE THE WORD CATALOG. PRESS THE RETURN KEY.
GROUND YOURSELF. TURN ON THE POWER SWITCH AT THE BACK OF THE KEYBOARD OR TYPE IN PR#6.	TYPE RUN. PRESS THE RETURN KEY.

"USE AND CARE OF DISKS"

(Courtesy Alberta Department of Education)

DO NOT TOUCH THE GREY, EXPOSED AREA OF THE DISK



DO NOT OPEN THE DISK DRIVE DOOR WHEN THE RED LIGHT IS ON.

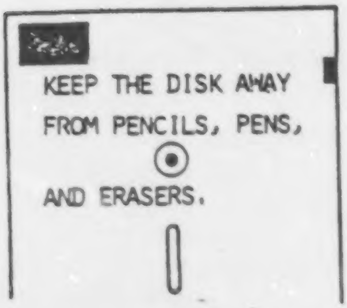
DO NOT BEND OR FOLD THE DISK.

KEEP THE DISK AWAY FROM MAGNETS.

DO NOT PLACE THE DISK ON DISK DRIVE, MONITOR, OR COMPUTER.

DO NOT LEAVE THE DISK OUT OF ITS JACKET.

WHEN YOU ARE FINISHED WITH THE DISK, STORE IT IN THE JACKET.



KEEP THE DISK AWAY FROM PENCILS, PENS, AND ERASERS.

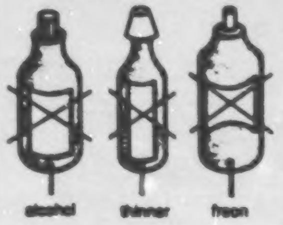
STORE THE DISK STANDING UP.

maxell.
Floppy Disk Handling and Storage

Handling precautions to protect against possible failure

1. Do not touch disk surface. It is easily contaminated, which causes errors.

2. Do not use alcohol, thinners or freon to clean disk.

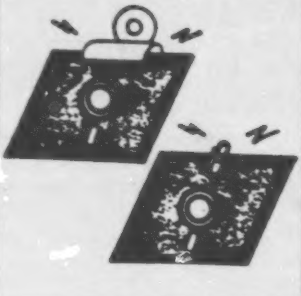


3. Do not use magnets or magnetized objects near the disk.
Data can be lost from a disk exposed to a magnetic field.

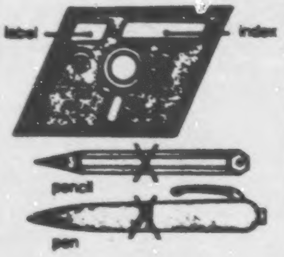
4. Do not bend or fold the disk.

5. Do not place heavy objects on the disk.

6. Do not use rubber bands or paper clips on the disk.

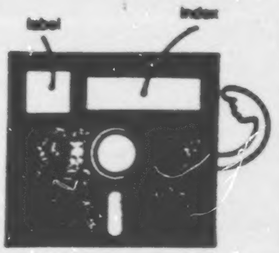


7. Do not write on disk label with pencil or ball-point pen. Use felt-tip pen only.



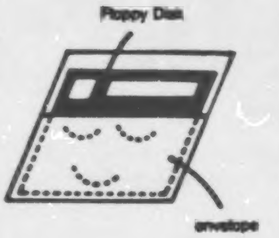
8. Do not use erasers on disk.

9. Apply index label to the right of Maxell label. Do not use labels in layers.

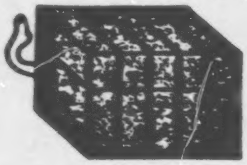


10. Insert carefully by grasping upper edge and placing it into the drive.

11. Keep disk in its protective envelope when not in use.



12. Disks not being used should be stored vertically in their box.



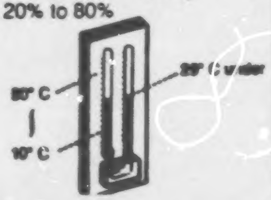
13. Do not expose the disk to excessive heat or sunlight.

14. Operating environment.

A. Temperature: 10°C to 50°C (50°F to 122°F)

B. Wet Bulb Temperature: Less than 29°C

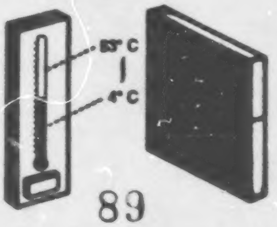
C. Relative Humidity: 20% to 80%



15. Storage environment:

A. Temperature: 4°C to 53°C (40°F to 127°F)

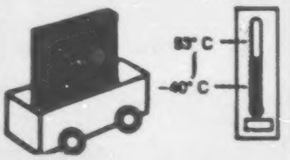
B. Relative Humidity: 8% to 80%



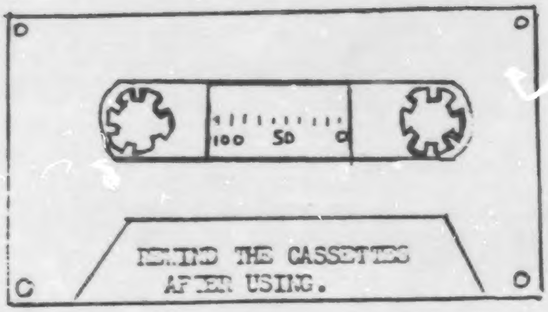
16. While in transit the disk should be in its envelope in a protective box within the following ranges:

A. Temperature: −40°C to 53°C (−40°F to 127°F)

B. Relative Humidity: 8% to 90%

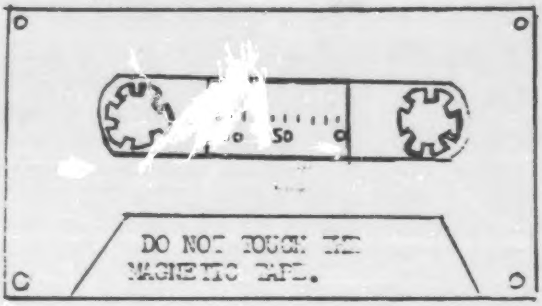


BEST COPY AVAILABLE

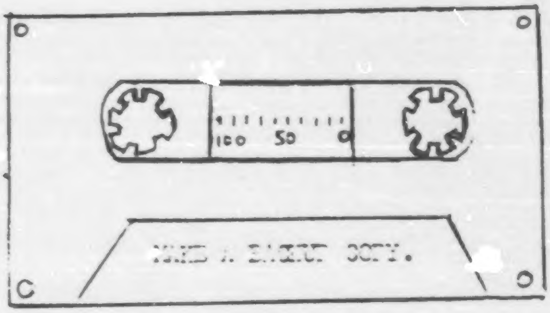


REWIND THE CASSETTES AFTER USING.

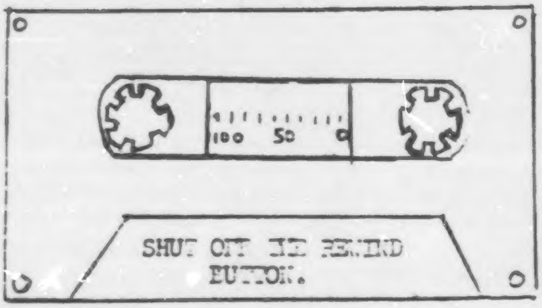
CARE OF CASSETTES



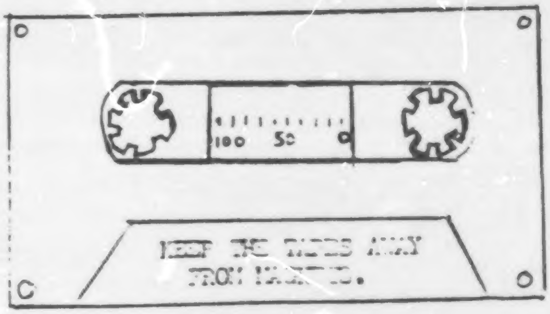
DO NOT TOUCH THE MAGNETIC TAPE.



MAKE A BACKUP COPY.



SHUT OFF THE REWIND BUTTON.



KEEP THE TAPES AWAY FROM MAGNETS.

BEST COP

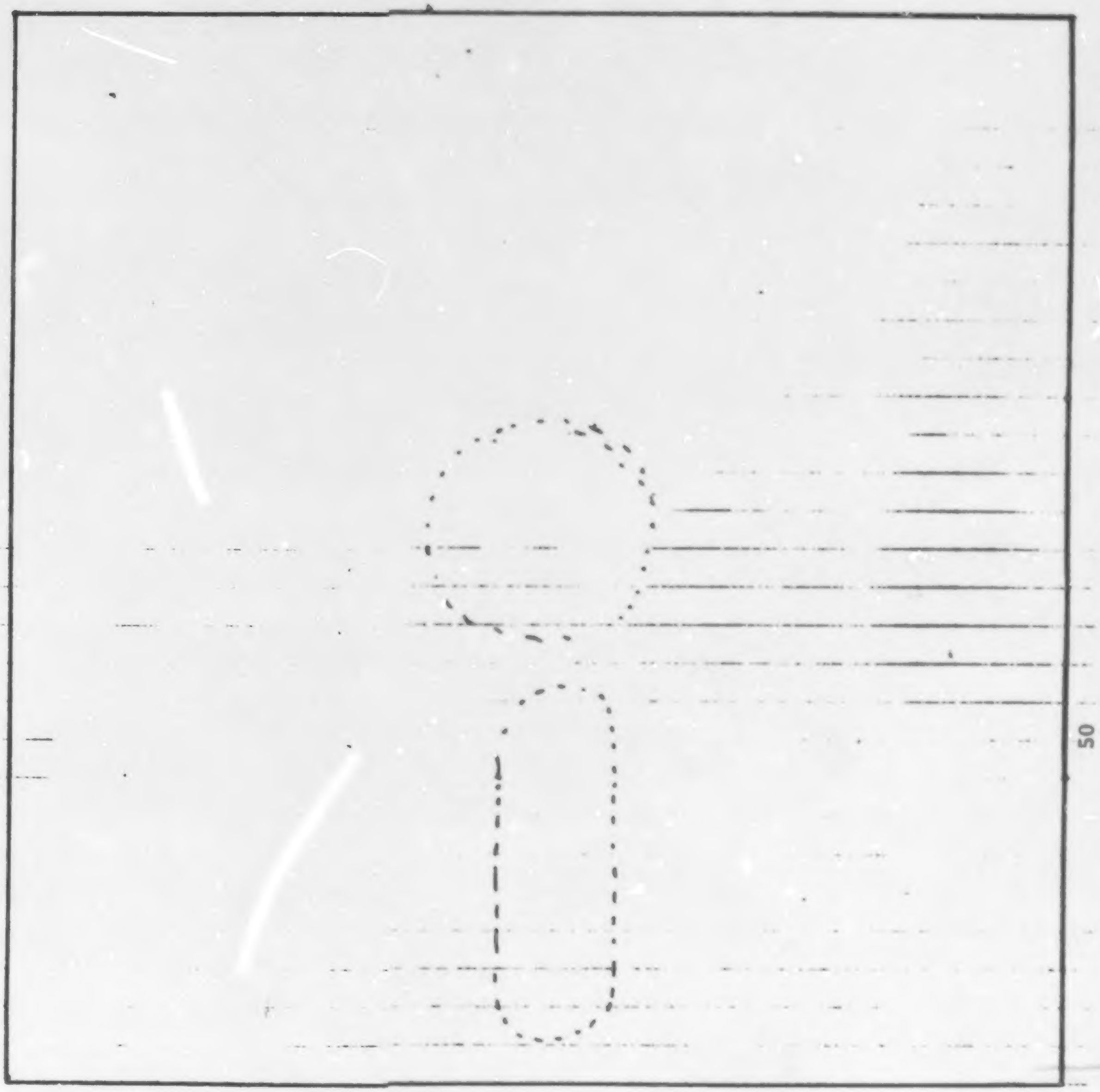
Poetry

Write a poem about how to care for diskettes.

Write the GOOD copy on the following page.

Decorate appropriately.

49


50

RESPECT AND RESPONSIBILITY FOR EQUIPMENT AND MATERIALS

This activity is designed to establish responsibility for computer equipment.

Suggestions:

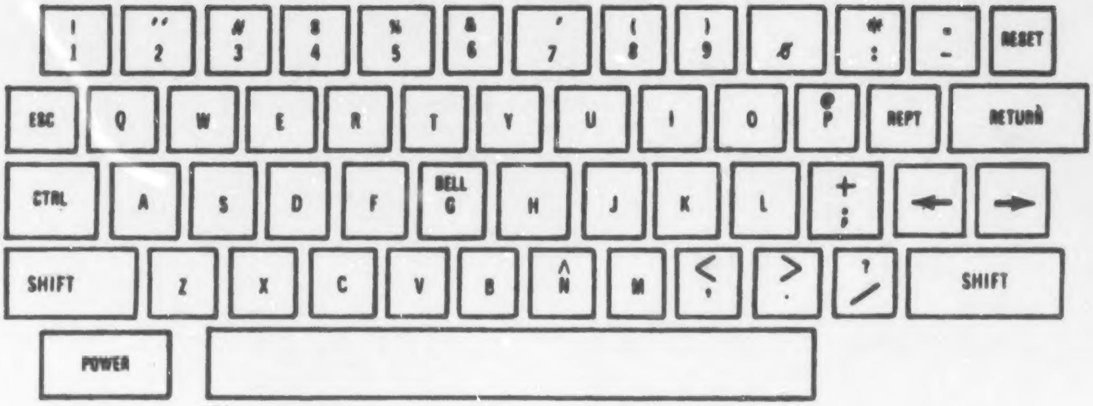
1. As a large group brainstorm for classroom rules.
2. Categorize rules and discuss each one.
3. Break up into groups and make posters for the computer center so that graphic reminders of established rules are available.

"RULES" ACTIVITY

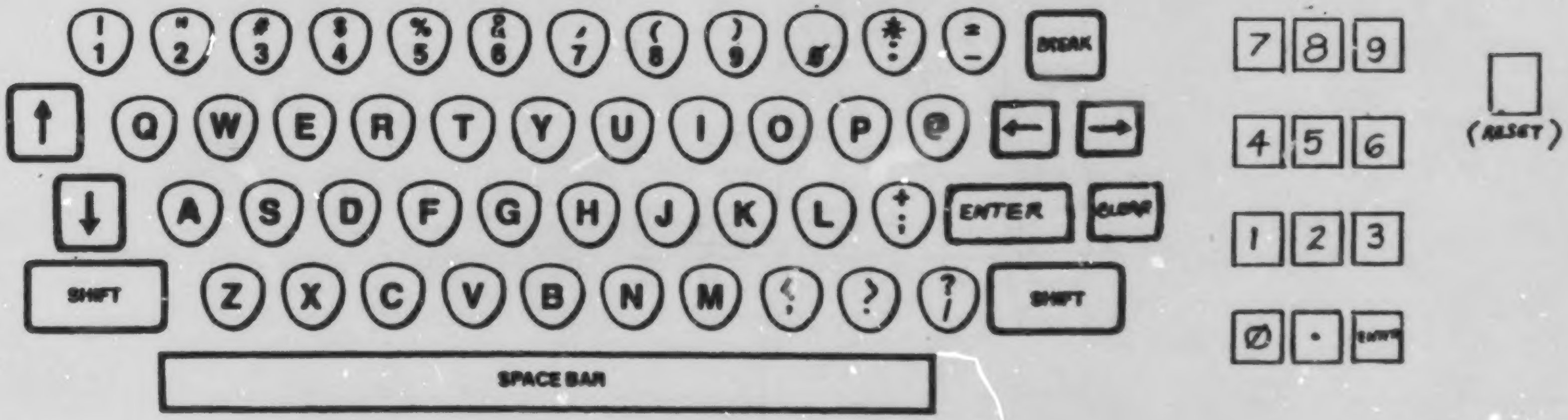
Refer to I-2-5.

Write a poem about the rules your class has made posters for. Display poems with the appropriate poster.

APPLE II KEYBOARD

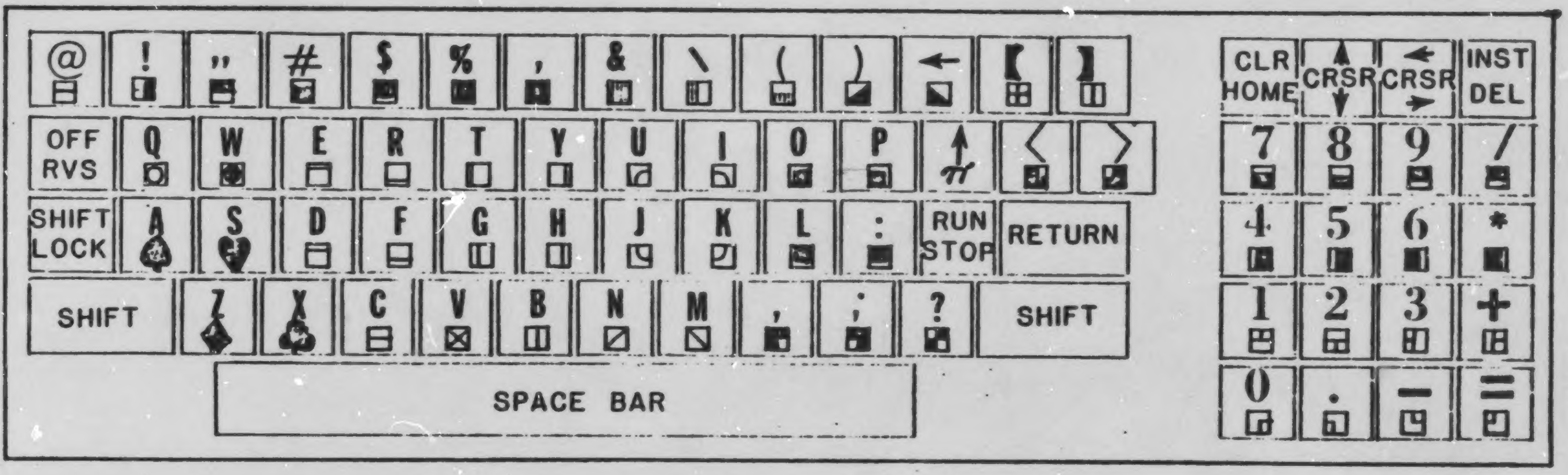


TRS-80 MODEL III KEYBOARD



BEST COPY AVAILABLE

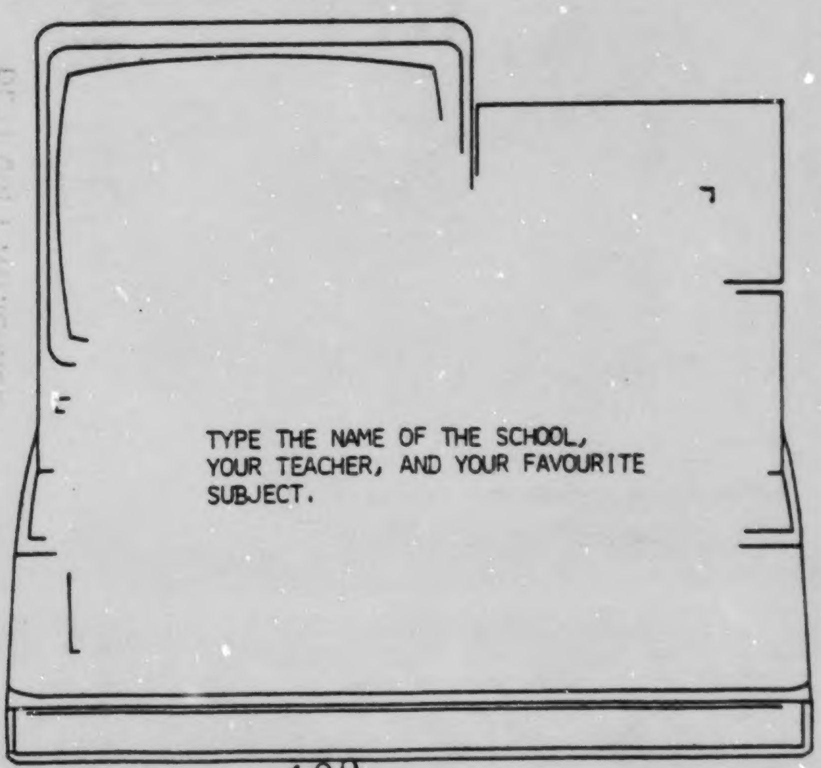
PET KEYBOARD



ACTIVITY CARDS

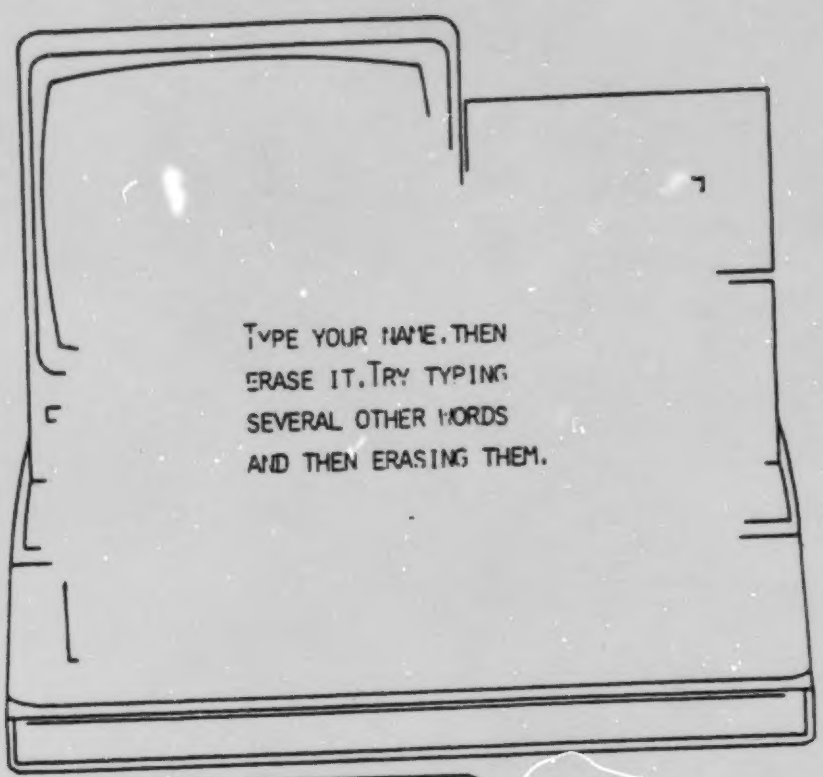
(Courtesy Alberta
Department of Education)

TYPE YOUR NAME, ADDRESS,
AND TELEPHONE NUMBER.

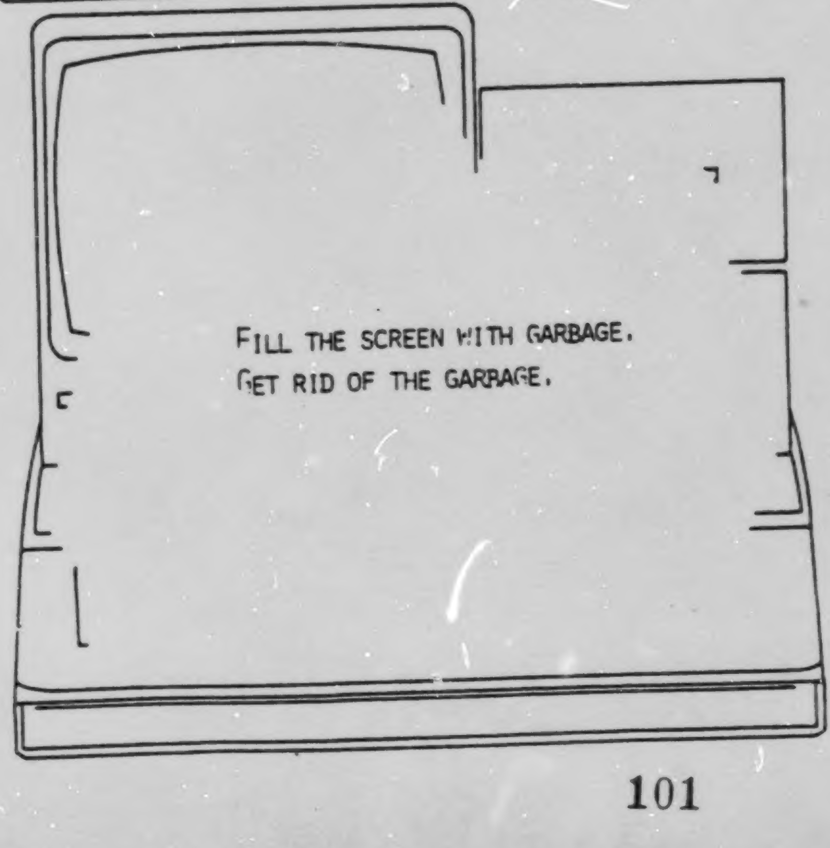


TYPE THE NAME OF THE SCHOOL,
YOUR TEACHER, AND YOUR FAVOURITE
SUBJECT.

NOTE: Should be
reproduced into
activity cards.

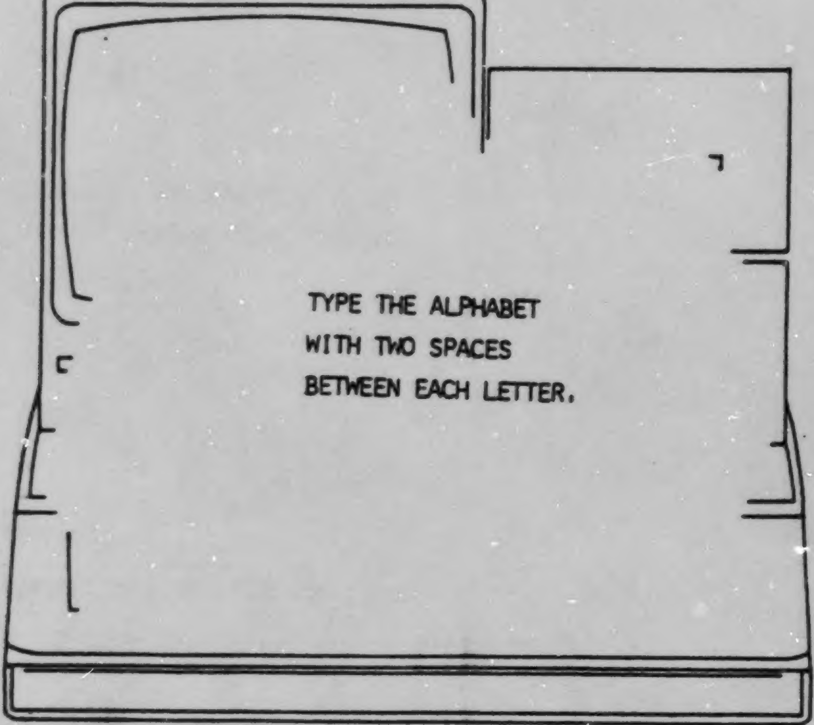


TYPE YOUR NAME. THEN ERASE IT. TRY TYPING SEVERAL OTHER WORDS AND THEN ERASING THEM.

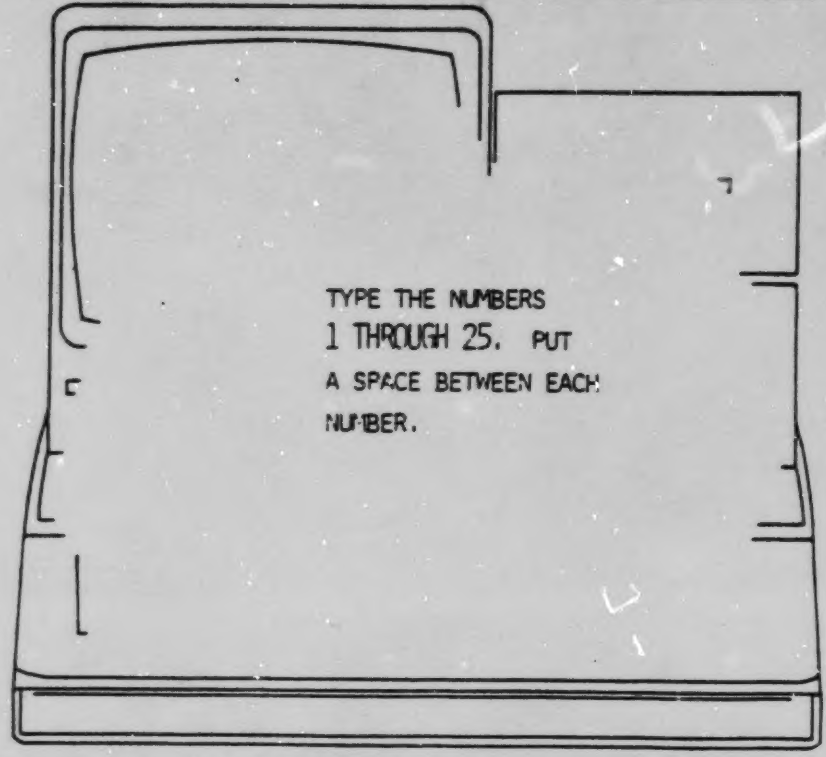


FILL THE SCREEN WITH GARBAGE. GET RID OF THE GARBAGE.

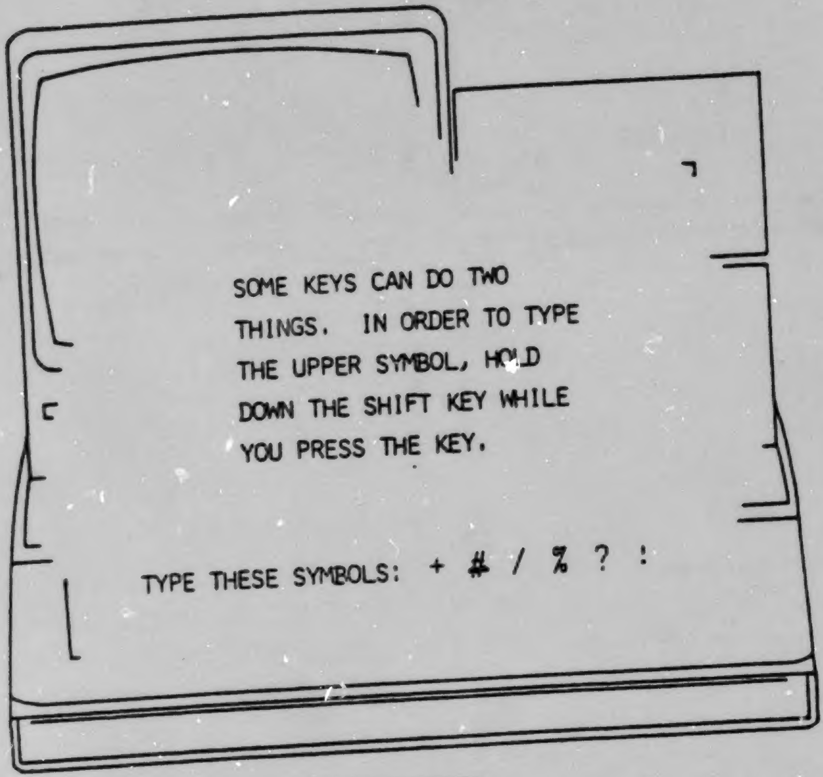
BEST COPY



TYPE THE ALPHABET
WITH TWO SPACES
BETWEEN EACH LETTER.

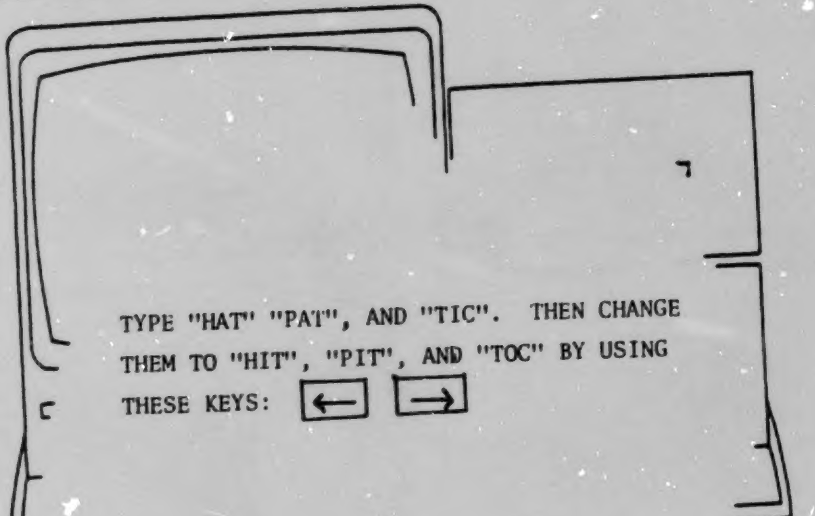


TYPE THE NUMBERS
1 THROUGH 25. PUT
A SPACE BETWEEN EACH
NUMBER.



SOME KEYS CAN DO TWO THINGS. IN ORDER TO TYPE THE UPPER SYMBOL, HOLD DOWN THE SHIFT KEY WHILE YOU PRESS THE KEY.

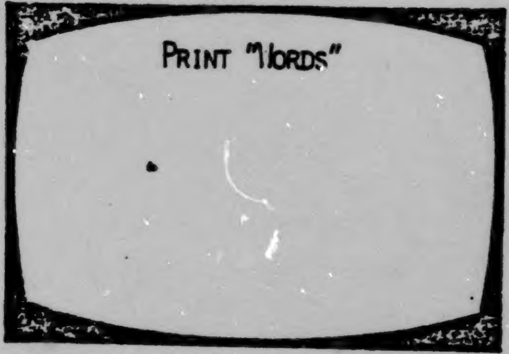
TYPE THESE SYMBOLS: + # / % ? !



TYPE "HAT" "PAT", AND "TIC". THEN CHANGE THEM TO "HIT", "PIT", AND "TOC" BY USING THESE KEYS: ← →

INTRODUCING "PRINT"

STUDENT WORKSHEET

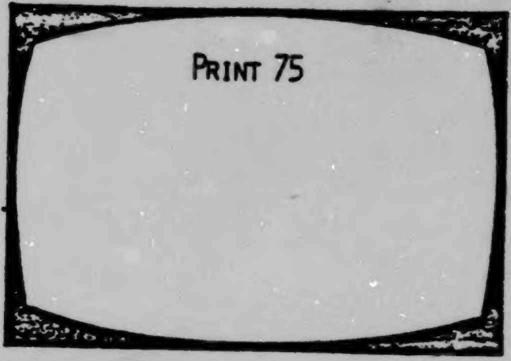

PRINT "WORDS"

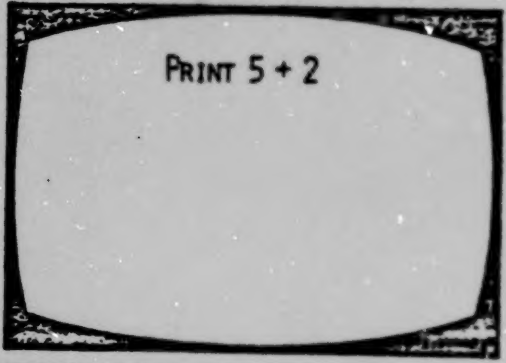
PRINT WORDS

PRINT "LOTS OF WORDS"

PRINT "I SPEAK BASIC."

TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.


PRINT 75


PRINT 5 + 2

PRINT "5 + 2"

PRINT 20 - 13

(Courtesy Alberta Department of Education)

BEST COPY AVAILABLE

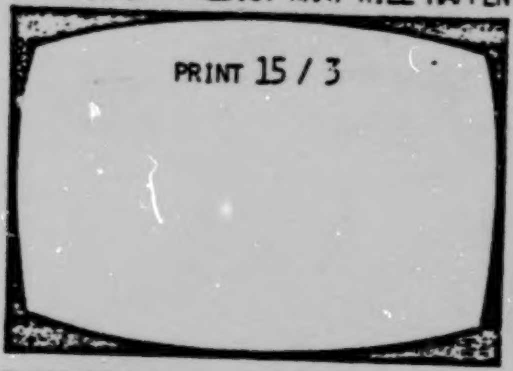
```
PRINT 2 * 3
```

```
PRINT 10 * 5
```

```
PRINT 7 * 3
```

```
PRINT 2 * 5 * 3
```

TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.



```
PRINT 15 / 3
```

```
PRINT 20 / 2
```

```
PRINT 36 / 9
```

```
PRINT 49 / 2
```

INTRODUCING VARIABLES

STUDENT WORKSHEET

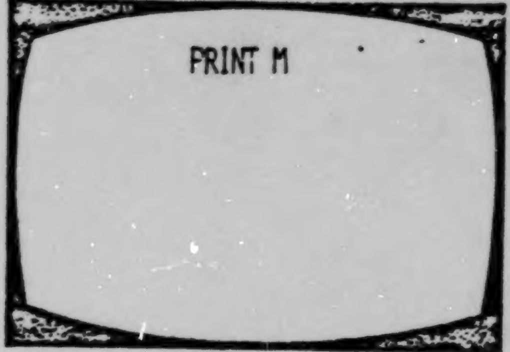
```
PRINT M
```

```
PRINT "M"
```

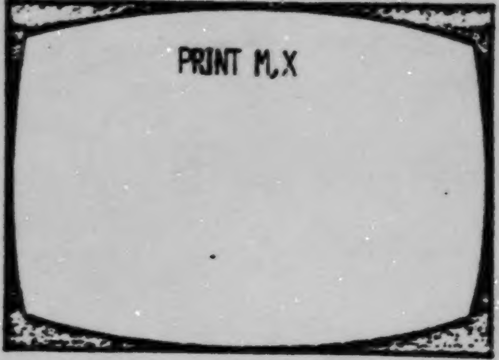
```
LET M = 10
```

```
LET X = 5
```

TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.



```
PRINT M
```



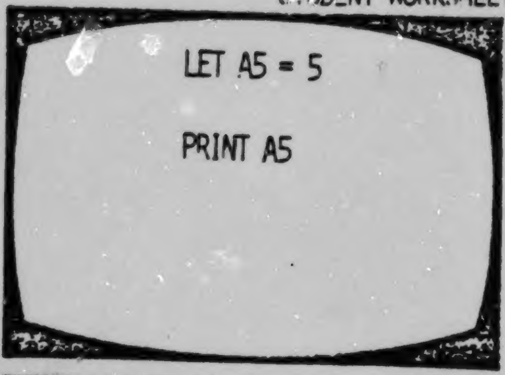
```
PRINT M,X
```

```
PRINT M; X
```

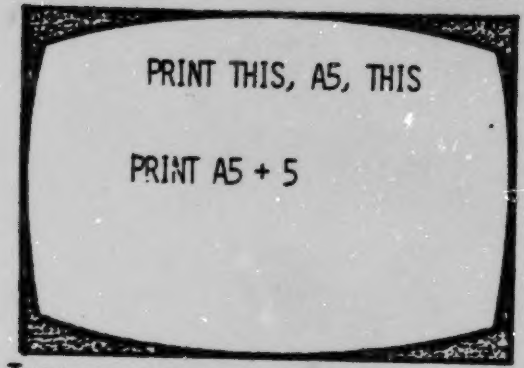
```
PRINT M + M
```

(Courtesy Alberta Department of Education)

```
LET THIS = 157

PRINT THIS
```



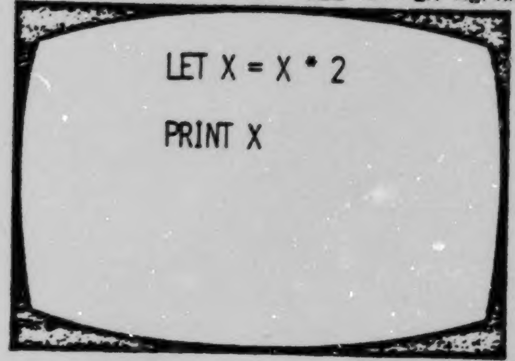
```
LET A5 = 5

PRINT A5
```



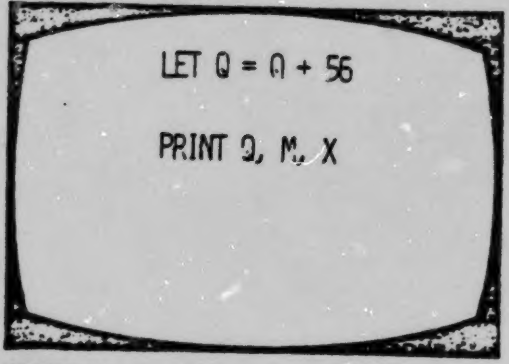
```
PRINT THIS, A5, THIS

PRINT A5 + 5
```

```
LET M = M + 1

PRINT M
```

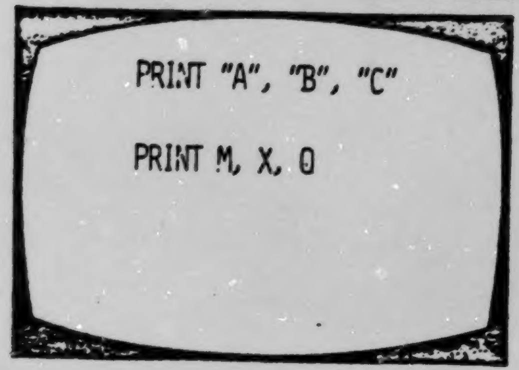
TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.



```
LET X = X * 2

PRINT X
```



```
LET Q = Q + 56

PRINT Q, M, X
```



```
PRINT "A", "B", "C"

PRINT M, X, Q
```

```
PRINT "BOYS, "GIRLS"

PRINT X, Q
```

I-4-4

HOW AM I DOING?

Name ______________________________

Date ______________________________

1. I can find the following parts on a computer:
   - a) Disk drive (where applicable) ______________________________
   - b) Monitor ______________________________
   - c) Keyboard ______________________________
   - d) Disk ______________________________
   - e) Cassette recorder (Data Set) ______________________________
2. I can tell my teacher the purpose of the following:
   - a) Disk drive ______________________________
   - b) Monitor ______________________________
   - c) Keyboard ______________________________
   - d) Disk ______________________________
   - e) Cassette recorder (Data Set) ______________________________
3. I know when to use the following keys:
   - a) Reset button ______________________________
   - b) Space bar ______________________________
   - c) key ______________________________
   - d) key ______________________________
   - e) Return/Enter key ______________________________
   - f) Shift key ______________________________
4. I feel that I am
   - a) learning to use a computer ______________________________
5. I have feelings about computers:
   - a) Computers are challenging ______________________________
   - b) Computers are frightening ______________________________
   - c) Computers arouse my curiosity ______________________________
   - d) Computers are very important ______________________________
   - e) I have confidence in my ability to operate a computer ____
   - f) Computers make me nervous ______________________________
   - g) Computers are exciting ______________________________
6. Elaborate on your answers to No. 5 by writing a story.

Story Starter: I have feelings about computers . . .

Simulation Game: "What's in a Computer"

Material: 1 bristol board
Cards with numbers 0 to 9, +, -, ÷, and x on them
Felt pens
Blank cards
9 students wearing signs taped on their foreheads
- 1 student wearing USER
- 1 student wearing INPUT
- 1 student wearing CPU
- 5 students wearing MEMORY
- 1 student wearing OUTPUT

Directions:

1. On a piece of bristol board, reproduce a keyboard. See the sample keyboard at the end of this activity. Have "Input" wear this keyboard around his/her neck.
2. Set a table in front of "Input" with stacks of cards from 0 to 9 as. well as cards with +, -, ÷, and x.
3. A "User" (from the class) will come forward and hit a number key on the keyboard (e.g., 5). "Input" will select the "5" card from the pile and give it to a person or cell in "memory".
4. "User" then hits another key (e.g., +). "Input" passes "+" key to Memory.
5. "User hits a third key on keyboard (e.g., 3). "Input" passes "3" card to "Memory".
6. "Memory" now selects a blank card and writes "5 + 3" on it. Then this card is passed to "CPU".
7. "CPU" selects two blank cards and writes "=" and "8" on them. These cards are then passed to "Memory".
8. "Memory" now has 5 positions filled as follows:

9. One person in "Memory" selects a blank card and writes "8" on it. The "8" is then passed to "Output".
10. "Output" displays the answer.

INPUT/OUTPUT - THE FIVE SENSES

Have pupils examine human input and output actions through experience with each of the five senses.

Materials arranged in 5 stations:

1 - smell: common spices, fruit, etc.

2 - taste: pieces of fruit, cookies, vegetables, etc.

3 - feel: materials of varying texture, hardness, temperature, etc.

4 - hearing; cassette recordings of varying moods (e.g., humorous, sad, happy, frightening)

5 - sight: pictures, diagrams, or cartoons of varying moods (e.g., boring, humorous, complex, simple, sad, frightening)

Procedure:

Divide the class into 5 groups. Have them visit each station (in any order). Have one member of the group experience the material appropriately while the rest of the group records the observed input and output.

Example: INPUT - held garlic under nose and sniffed
OUTPUT - winced, frowned, eyes watered

HUMAN INPUT - HUMAN OUTPUT

(Courtesy Alberta Department of Education)

Make an overhead copy of "HUMAN INPUT--HUMAN OUTPUT" and share student findings. Discuss:

- Humans receive input through the five senses. This information is passed on to our processing centre, the brain, which in turn tells us what to do or how to react.

Enlarge the worksheet "HUMANS CAN...HUMANS CANNOT..." into a poster. Have students generate a list of words that apply to what humans can and cannot do. Put these words onto the poster and maintain an ongoing list. Students should also be given a copy of this poster and maintain an ongoing list of activities humans can and cannot do.

Bring a computer system into the classroom and explain to students that a computer also operates by using input, processing, and output.

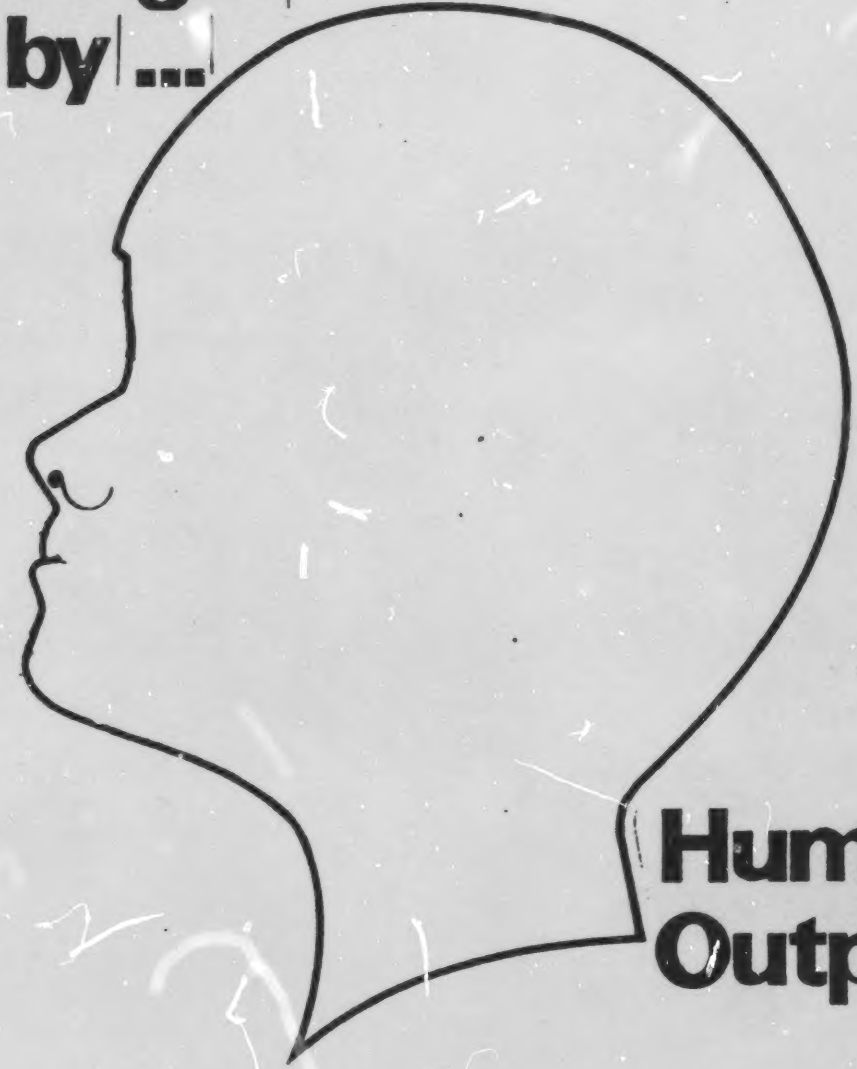
(a) Demonstrate that the computer can receive input or information from the keyboard. Type in some math problem. Example: PRINT 500 + 99 return (format for Apple II). The computer very quickly processes this information in the Central Processing Unit, and the answer or output is shown on the monitor as 599.

(b) If you have a disk-operating system or a cassette-operating system, demonstrate how a disk or cassette can also give the computer input or information.

Make an overhead transparency of "COMPUTER INPUT...AND COMPUTER OUTPUT" and list types of computer input and output.

"HUMAN INPUT--HUMAN OUTPUT"-

Humans get Input by ...



Humans give Output by ...

112

113

Computer Input...

Computer Output

INPUT, PROCESSING, OUTPUT

Most activities in life provide examples of input, processing, and output. For example: brushing teeth

INPUT:	dirty teeth
PROCESSING:	brushing of teeth
OUTPUT:	shiny/clean teeth

Select another "daily activity" and draw cartoons to show input, processing and output.

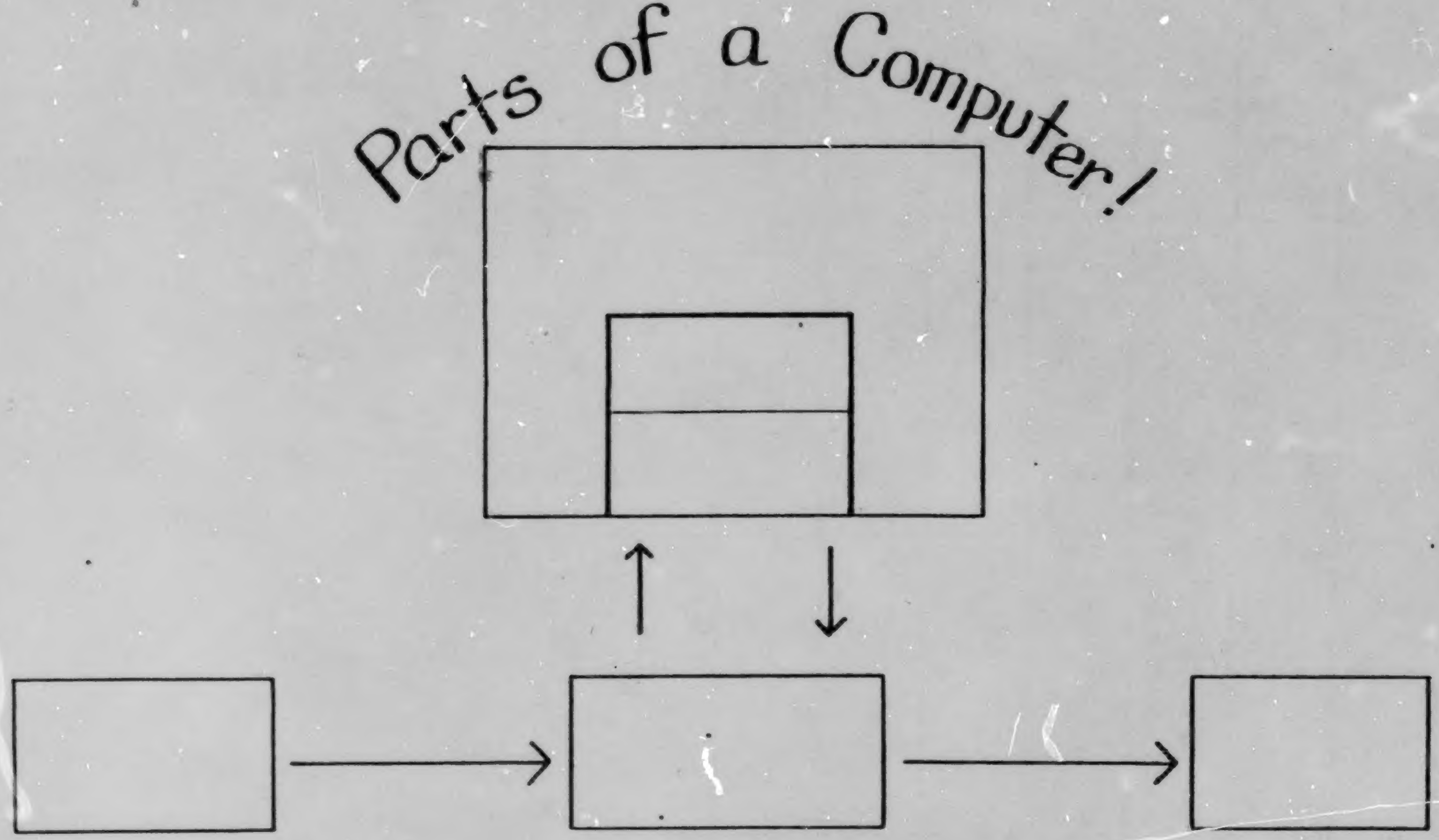
A sample worksheet follows.

INPUT, PROCESSING, AND OUTPUT

Input	Processing	Output
1.		?
2.		?
3.		?
4.	?	
5.	?	
6.	?	
7. ?		
8. ?		
9. ?		

PARTS OF A COMPUTER

Fill in the names for the major parts of a computer.



II-2-1
(I)

Hardware
Software

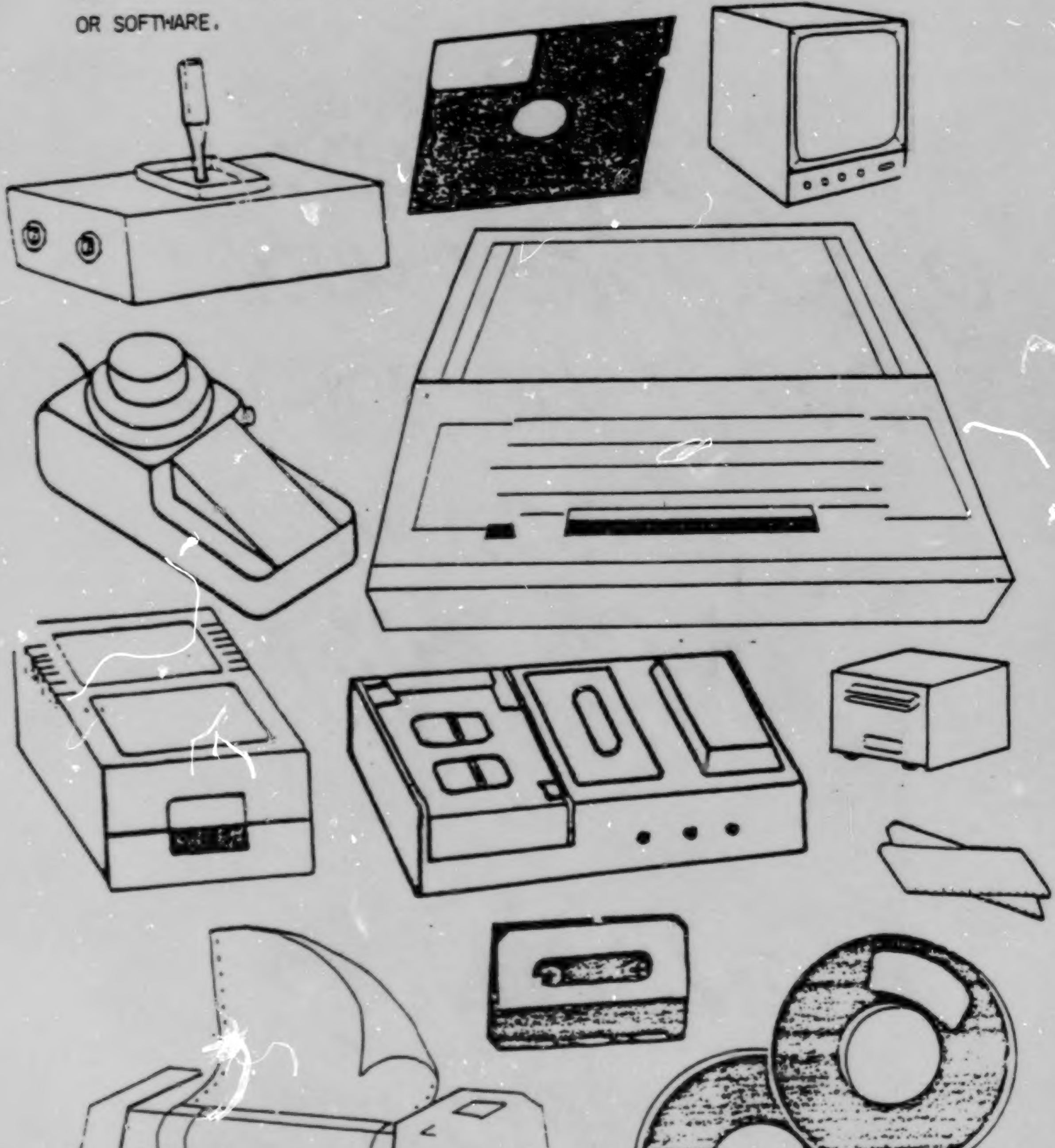
- Lable each picture.
- Glue on 2 pages with headings for each page.

73

(Courtesy Alberta Department of Education)

HARDWARE AND SOFTWARE ACTIVITY SHEET

CUT OUT THE PICTURES AND PASTE UNDER THE APPROPRIATE TITLE OF HARDWARE OR SOFTWARE.

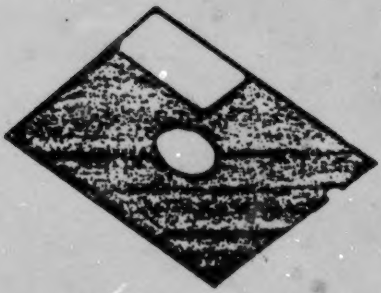


ANSWER KEY TO COMPUTER SOFTWARE

CASSETTE TAPE

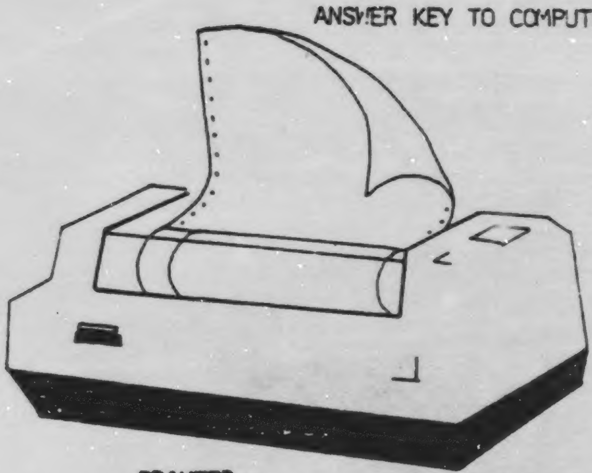
COMPUTER CARDS

MAGNETIC TAPE

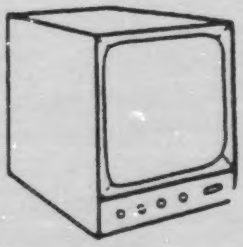


FLOPPY DISK

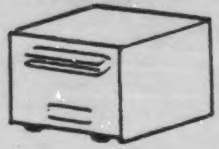
ANSWER KEY TO COMPUTER HARDWARE



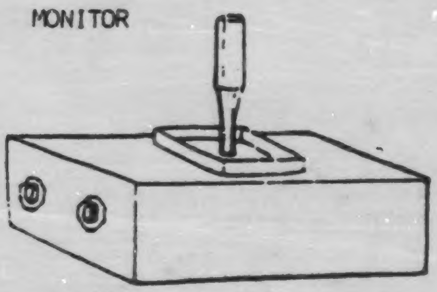
PRINTER



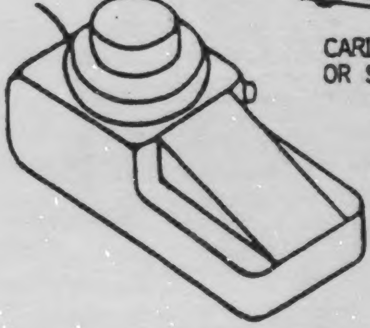
MONITOR



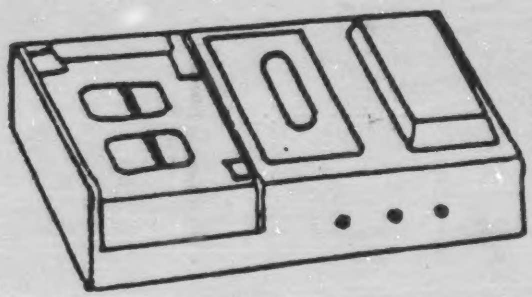
CARD READER
OR SCANNER



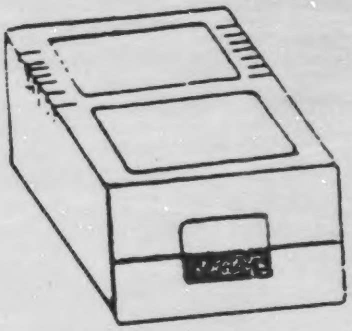
JOYSTICK



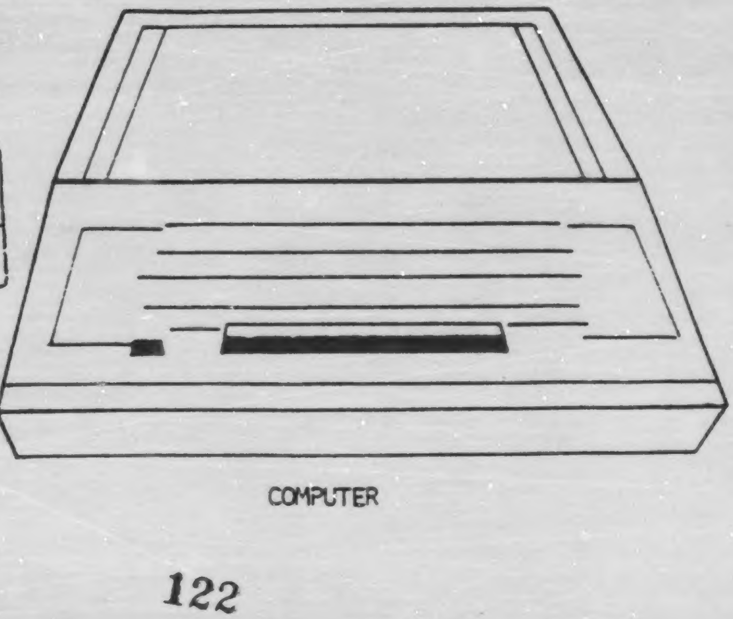
GAME PADDLE



CASSETTE TAPE RECORDER



DISK DRIVE



COMPUTER

HARDWARE/SOFTWARE

Technology is rapidly progressing. With this in mind, design a new piece of hardware for the year 2050. Write a description of your piece of hardware and draw a diagram of it. Write an advertisement to sell your hardware to consumers.

Steps in writing an advertisement are:

1. determine a catch title,
2. write a brief description of the item or article, and
3. describe briefly why someone should buy your item.

CAPABILITIES OF COMPUTERS

Prepare a questionnaire dealing with what you know about the capabilities of computers. Give your questionnaire to your friends:

1. who have not had any experiences with computers.
2. have had experiences with computers.

Compare the results.

Follow-Up

Graph your results.

COMPUTER STATISTICS SHEET

Twenty-five years ago, it cost $1.26 to do 100 000 multiplications by computer. Today it costs less than a penny.

If the cost of other things had gone down the way computing costs have, you'd be able to:

> buy sirloin steak for about 2¢ a kilogram, a good suit for $6.49, a four bedroom house for $3 500.00, a standard-size car for $200.00, an around-the-world airline trip for $43.00.

In 1944, the first large scale automatic computer, the Mark I, built by Harvard University and IBM, could perform about 2 000 multiplications per second. Today, a new IBM 4341 can perform nearly a quarter of a million multiplications in the same time. That's about 125 times faster.

If technology and productivity in other industries had progressed at the same rate as computer technology, an around-the-world airline flight would take 24 minutes, and a standard-size car would get 800 kilometres per litre.

In one second, an IBM 3033 Attached Processor can execute 5.5 million instructions. In that time, the 3033 AP could receive inquiries from 180 airline reservation clerks, check on whether seats are available and start information back to the clerks.

The IBM 3850 Mass Storage system can hold up to 472 billion characters. That's enough storage capacity to have a 100 character record for every person in the world, or to hold as many words as are contained in 27 million pages of a daily newspaper.

A magnetic bubble memory device, built by IBM, can store the equivalent of about 100 pages of the Manhattan telephone directory (25 million bits of information) in an area only one inch square. The magnetic bubbles are only a millionth of a metre or 1/25 000 of an inch in diameter.

If you could take a three foot step every nanosecond (billionth of a second), in one second you could walk around the world 23 times. The IBM 4341 has switching speeds of 3-5 nanoseconds, and circuits have been developed that can switch in 13 picoseconds (trillionths of a second). A nanosecond is to a second what a second is to 30 years. And a picosecond is to a second what a second is to 31 710 years.

The IBM 3800 printer can print up to 450 lines per second. At that rate, it can print a 225 page book in a minute.

Excerpts from: How many angels can dance on the head of a chip? DATA, 10 (1) 1980.

Compile a factual statistics sheet outlining the capabilities of computers. Research this information from various sources: statistics sheet provided, computer reference books, pamphlets from computer stores or from computer manufacturers or distributors. Use these statistics to create a "Believe It or Not" or "That's Incredible" brochure to add to class reading material on computers.

"RECORD SHEET"

STATION ______________ CALCULATING DEVICE ______________

GROUP MEMBERS' NAMES ______________

INPUT PROBLEMS	CORRECT OUTPUT	CHECK IF CORRECT	TIME TO ANSWER (LIMIT OF 5 MINUTES. PROCEED TO NEXT PROBLEM.)
2 + 3	5	✓	2seconds
12 + 19	31		
20 - 10 + 3	13		
12 X 2	24		
100 X 10	1000		
60 ÷ 5	12		
(3 + 2 + 5) X (4 + 4)	120		
1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9	45		
(22080 ÷ 46) + (12 X 12)	624		

(Courtesy Alberta Department of Education)

II-5-2
(P)

STUDENT SHEET

NAME ____________________

DATE ____________________

MACHINE DECISIONS

Which machine or machines would you choose?

	Computer	Calculator	Electronic Game
1. You want to add your purchases at a grocery store.			
2. Your friend is coming over for the afternoon and you want something to play with.			
3. You own a small business and you want to keep track of the accounts.			
4. You need some help with your homework.			
5. You want a machine for your birthday.			
6. You want to buy your father something for Christmas that he can use at work.			
7. You work in a library and need a machine to keep track of all the books.			
8. You are a teacher and need to figure out report card marks.			
9. You are going on a trip by plane and want something to play with.			
10. You are a manager of a supermarket and need something to keep track of food items and prices.			

(Courtesy Alberta Department of Education)

Electronic games have become an important part of our everyday lives. Design a new electronic game. Become a "super salesman" and sell your new game to an archade. You must provide the "buyer" with a pamphlet that describes how your game works, a picture of your game, and special features of your game.

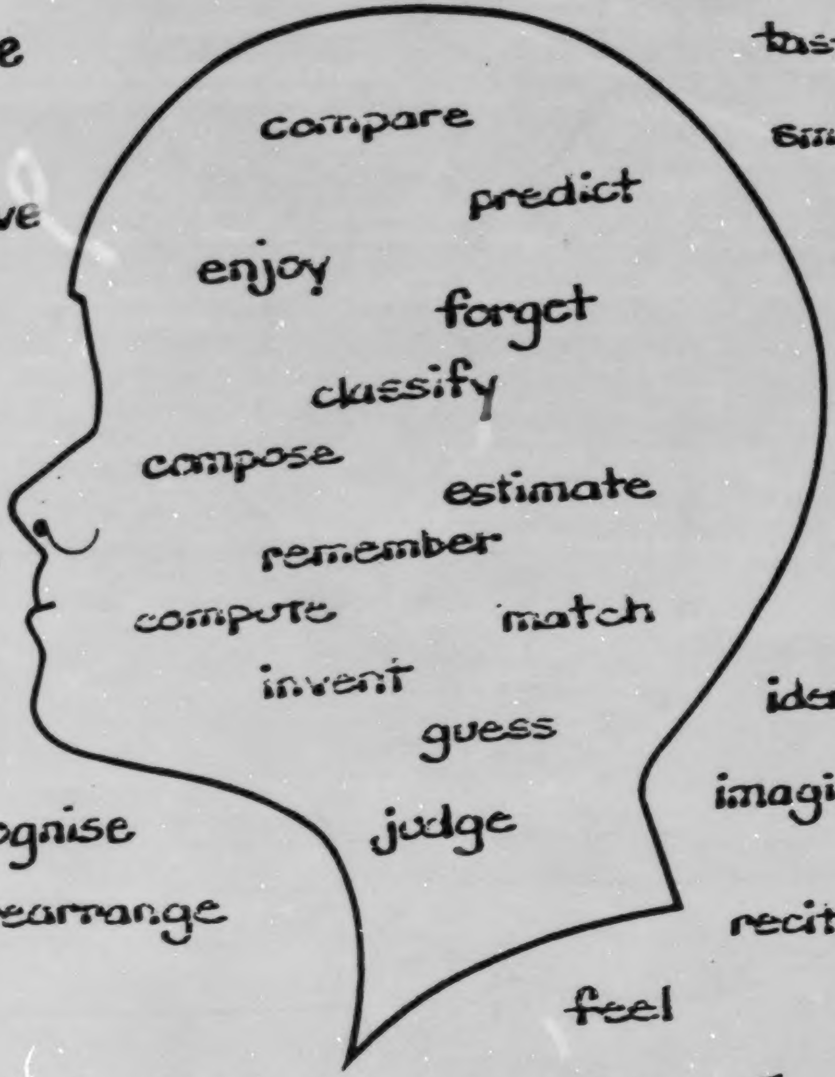
Humans can ...

Humans cannot ...

(Courtesy Alberta Department of Education)

*Sample answers

Humans can ...



suffer
sort
hear
see
taste
compare
smell
observe
predict
enjoy
forget
write
classify
compose
estimate
create
remember
compute
match
ecite
invent
identify
guess
imagine
recognise
judge
rearrange
recite
feel

Humans cannot ...

[illegible]k without rest or food
work without error
Calculate rapidly

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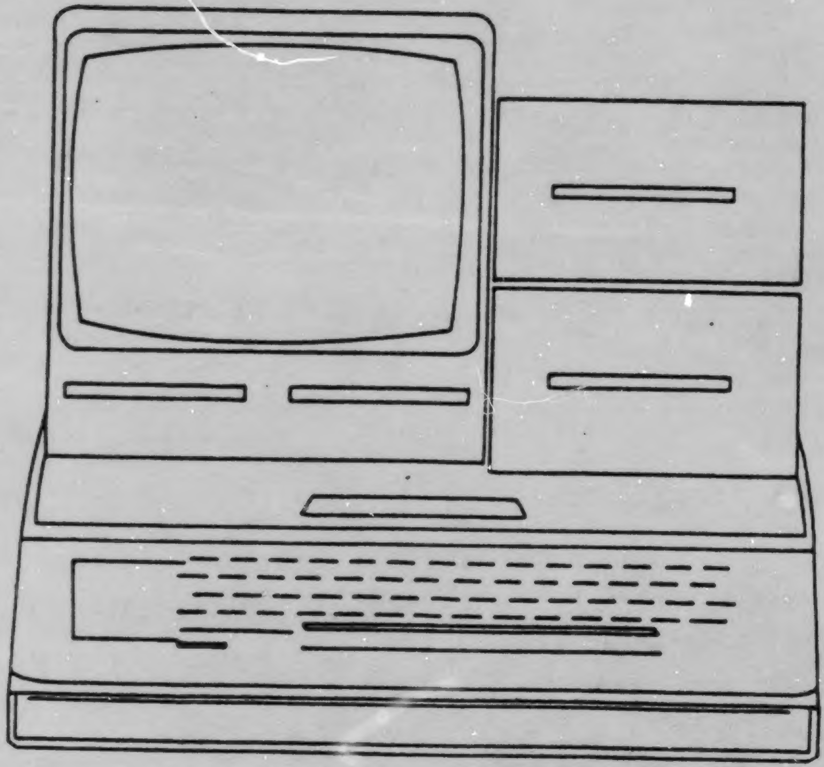
Computers Can ...

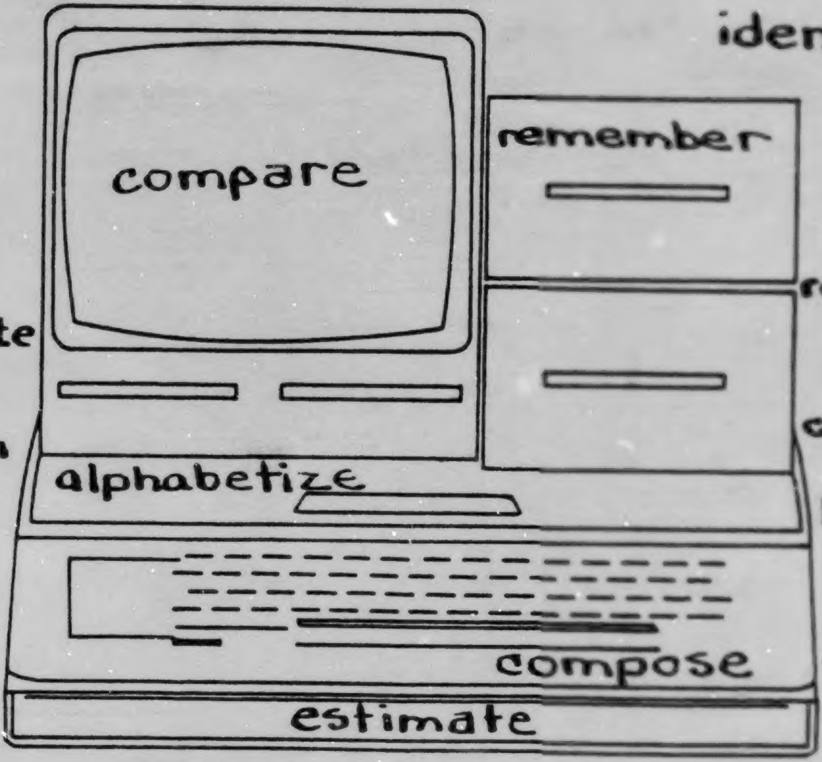


Computers Cannot ...

Sample answers

Computers Can...

rearrange
sort
choose
observe
write
calculate
identify



compare
remember
recognize
compute
match
classify
alphabetize
predict
recite
compose
describe
estimate

Computers Cannot...

guess
suffer
love
forget
create
invent
imagine
judge
enjoy

Danny Dunn and the Homework Machine

By Jay Williams and Raymond Abrashkin

McGraw-Hill, 1958.

CHAPTER FOUR

MEET MINIAC

Professor Bullfinch's laboratory was a long, low structure at the rear of the house, reached by a short hallway. It was crowded and cluttered with equipment, but at one end a large space was clear. Here, there was a curved desk on which were a typewriter and a microphone. A high panel at the back of the desk was filled with tiny light bulbs. There were a number of flat, square buttons, each with a colored panel above it. And beyond the desk was an oblong, gray metal cabinet, about the size of a large sideboard, with heavy electric cables leading to it.

"Danny," said the Professor gravely, dropping his shirts on a chair, "I have decided to give you a big job. I'm sure you can do it. I'm going to leave Miniac in your care."

"What?" cried Joe. "You're going to leave a maniac in his care? He's not old enough."

"Miniac, Joe," Danny said. "It's the Professor's new computer." He pointed to the desk and cabinet. "The first midget giant brain."

Professor Bullfinch blinked, mildly. "Midget giant?" he said. "That's a little confusing, Dan. Let's just say it's the world's smallest automatic computer."

"And you call it Miniac?" Irene asked, with interest.

"Short for 'miniature automatic computer,'" Danny explained. "Gosh! it's exciting. The Professor finished work on it yesterday. You know, scientists have been trying to make these electronic brains smaller. The Professor has invented a new type of tiny switch and a narrower magnetic tape. Those made it possible for him to build a computer as small as this."

"It doesn't look so small," Joe remarked.

"Dr. Aiken's Mark I computer, at Harvard, the first of the so-called giant brains, filled a whole room," said the Professor.

Joe was eyeing the machine in fascination. "So that's one of those mechanical brains," he said. "Is it thinking now?"

"No, Joe," said the Professor. "It only thinks when we ask it questions."

"You mean you can talk to it?"

"Yes, that is one of my improvements. You speak into the microphone, there on the desk, and it types its answers on this electric typewriter."

"Kind of spooky, isn't it?" said Joe, in awe. "I wonder what would happen if you sang into the microphone? Would it type do-re-mi?"

"That's a very interesting idea," said the Professor. "Perhaps we'll try it when I get home. Meantime--uh--you can be rehearsing."

"Professor," Irene said shyly, "could we--could we ask it a question? Just to see how it works?"

Professor Bullfinch stroked his chin. "I don't see why not. Of course, Danny knows its general operation--he has seen me working on it for more than a year."

"Go ahead, Irene," Danny said. "You try. Ask it one of our homework problems."

"Short for 'miniature automatic computer,'" Danny explained. "Gosh! it's exciting. The Professor finished work on it yesterday. You know, scientists have been trying to make these electronic brains smaller. The Professor has invented a new type of tiny switch and a narrower magnetic tape. Those made it possible for him to build a computer as small as this."

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"Go ahead, Irene," Danny said. "You try. Ask it one of our homework problems."

The Professor snapped a couple of switches. From the cabinet, a steady soft humming came. Several colored lights went on.

"Talk into the microphone, Irene," he said. "Speak slowly and clearly so that Miniac can understand you and translate your words into electrical impulses."

"I understand." Irene stepped close to the desk--or console, as it was called. "It seems strange to ask questions of a machine, doesn't it?" With a slightly nervous quaver in her voice, she said into the microphone. "Um ... John buys 20 yards of silk for thirty dollars. How much would 918 yards of silk cost him?"

The Professor pressed one of the flat keys. There was a brief pause. Several tiny lights blinked, then a green light flashed on, and the typewriter began to click as if a ghostly hand were striking the keys.

"$1,377.00," it wrote. And after a second or two, it added, "And worth it."

Joe blinked. "Hey! How does the machine know that?"

"Well," said Professor Bullfinch, "the computer has several different sections. There's the communications console, this desk through which the operator can talk to the machine and the machine can answer. Then there's an arithmetic unit that can work out sums, and a unit that can do comparisons and logical problems. And there's a memory unit in which all its information is stored. It has hundreds of tables and facts in its memory banks. Each fact is stored as an electrical pattern on magnetic tape, so altogether they take up very little room. The machine can look into its memory and tell you whether the price is right."

Irene breathed a long sigh. "It's--it's fantastic, like science fiction," she said. "A machine that can work all sorts of problems, give you answers to anything you want to know? It's kind of Superman!"

The Professor shook his head. "No, my dear," he said. "It is only a kind of supertool. Everything in this machine is inside the human head, in the much smaller space of the human brain. Just think of it--all the hundreds of thousands of switches, core memory planes, miles of wire, tubes--all that's in the big case and in this console--are all huge and awkward compared to the delicate, tiny cells of the human brain which is capable of doing as much as, or more than, the best of these machines. It's human brain which can produce a mechanical brain like this one.

"The computer can reason," he went on. "It can do sums and give information and draw logical conclusions, but it can't create anything. It could give you all the words that rhyme with moon, for instance, but it couldn't put them together into a poem."

"Ha! I feel better," Joe said. "People still have something the machine hasn't got."

"That's right. It's a wonderful, complex tool, but it has no mind. It doesn't know it exists."

Danny had been bending over the console, peering at it. Now he said, "Look, Professor! The red light is on. That means something's wrong, doesn't it? I'll turn off the power--"

He reached for the switch marked POWER OFF. Before he could touch it, the Professor caught his hand. "Danny," he said, "there you go again, jumping to conclusions. You must not be so headstrong. Now, think again."

Danny blushed. "Oh, yes," he said. "Now I remember. That red light means the typewriter has finished writing. It's the other, larger red light at the top that means electrical trouble."

"Exactly. Remember, my boy--a scientist takes nothing for granted."

"I will remember. I'm sorry, Professor. I was just excited--like you were a while ago. I wasn't thinking."

Professor Bullfinch rested his hands on the boy's shoulders. "I trust you, Dan," he said. "But you must not forget that this is not a toy. It's an electronic brain, a complicated instrument."

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Danny nodded. "What do you want me to do?" he asked humbly.

"You can finish feeding all these tables and data into it. I'll leave the material right here on the console. You can service the machine every morning; you know how to do that. And if you come across interesting material in the weekly Science News Letter, or Scientific American, you can feed it into the machine. You have the code tables--"

"Yes Professor."

Irene put in, "Professor Bullfinch, I'm very interested in science. You know, my father, Dr. Miller, has taught me a great deal. Do you think perhaps I could--well, help Danny, once in a while, if he doesn't mind?

"I don't mind," Danny said.

"Of course you can, my dear." Professor Bullfinch smiled at the girl. You may be a good influence on him." Then he turned to Danny and put an arm around the boy. "I know you'll be careful."

"I will, Professor. Honest."

"But-hum!--I know you have a habit of jumping right into things and thinking about them afterward. I want you to promise me one thing, and one thing only, Dan."

"Sure, Professor. What is it?"

"I don't think I can change you into a person who is less headstrong. But I want you to promise me that whenever you get one of your sudden, exciting, and interesting ideas for an experiment--"

"Yes?"

"I want you to count up to a million by thousands."

"Gosh!" said Joe. "That'll take him an hour."

"Yes, I know. That's just it," said the Professor. "Well, Danny?"

"Okay, Professor Bullfinch," said Danny soberly. "I promise."

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QUESTIONS TO ACCOMPANY "DANNY DUNN AND THE HOMEWORK MACHINE"

- Courtesy Doreen Hildebrand

I. Factual Knowledge

1. Use each word below in an interesting sentence:
   a) laboratory
   b) oblong
   c) midget
   d) fascination
   e) awe

2. Look up each word in the dictionary and write out its meaning:
   a) translate
   b) headstrong
   c) humble
   d) maniac
   e) gravely

II. Comprehension

1. What job did the professor give Danny to do? Describe his chores in detail.

2. Why was Joe confused between maniac and miniac?

3. Why does the phrase "midget giant" sound so confusing? Think up five other word pairs that give the same strange impression.

4. When Irene spoke into the micromphone, what did miniac do with the sounds her voice made?

5. How is the machine's brain different than the human's brain? What is the machine unable to do?

6. Why did the professor tell Danny to count up to a million by thousands whenever he got a new idea for experiments?

III. Application

Computer Word Search - See Attached.

IV. Analysis

Two pioneers leading to the development of computers are Blaise Pascal and Joseph Jacquard. Do some research on one of these men. Include where and when they lived, their early lives and their contributions to the world of machines.

V. Synthesis

1. Design a robot that will do a chore which you don't like doing.

2. Change an invention of today into computerized form. Explain how it would work and include a blueprint.
   Example: pencil, telephone, door lock, . . .

3. If you could have a homework machine help you do one subject in school, which would it be? Why?

4. Finish this story:

   I had a strange and troubled sleep. When I finally awoke, I knew something was different. As I went down for breakfast I realized that my entire family had turned into robots . . .

VI. Evaluation

Many people today are concerned because computers are taking over to such a great extent. Some are worried that people will even lose their jobs to a computer.

a) Do you think this will happen? _____________
Why or why not?

b) If it did happen, what should we do about it?

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III. Application

```
F B N V O L N B H V K H I Y M K G S B L U D Z P L L G I O T
O Q E X N S T Y B X V B P Q R H I X T B T U B L P N P Z E P
F Q T C P R J I M W R J P S K G Q C G Z V F U L I G O C W F
W C E L J L W M K D F P X T I B O Q S S P Y K E C T I K K L
R S P X K E M S B V F W X P O C L T E Y M K K I S V J U B P
Z O U Y X S I R B W V U T T S M T U J X M E B M R P O C J S
S S R B F M G I R K O R Q D C Z U W N D O N L E C U X L K N
T U P H U F I I Y P V M X A F C Y Z N Y S J S O T N Y F X T
W Z V F I R K C S V L T B J B L J R C C L I L C S O K F M T
Z W C M W O X F R M C L L X C Q L E N A P C I K R N E O I Q
E E P S S H Q W S O E W L F P T Q K B C K O T Z R J O P O P
C B V K P Q M G P S P Y I M E Q G D S V J T T T Q G O C P E
E H M A O C E C S S F H Z N J X F H N I Q X H G S X Y Z P W
F X T Y B G T G M E Q H O V Y W R H F O X S P T G B C R E Z
X A L Z Y N N U G R F I I N Z M N U V Y E X B J P H J U W R
D T W G F K L L Y K F C I E E X E G V M W E D T Y O B D S N
N T B X O P V E D C A I N I M J L Y C U U W L G G I W L G N
L P M F K S G C V Z F W Q U X J T N J C S E W O G M C R J H
P N O W F B K B D M Z W U P I G N N C C O M P U T E R G T J
P C H W G B C J M T X R G X P C G V J K T S J G S T P E T X
C Y X M B M E H T L M U E R D C F M R E T I R W E P Y T D Z
W I U W H W D H B W O W T X X E C X S M O D O G J B Z R J I
G K R Y V R C O R O X H E L I K T Y K V R Z Y J Y V K K N B
Q R W V S V Q N F L R M D Y I Z F K S T X V S F L J W O H I
L O M Q F E Y O W R D O I W R N S V C W D Z J Q L P K L E O
D Y K N O J I M G K S H O I C V Q N N O C I U O U P N I Z Z
L W E M L G K K S U W X Y X O L H B K O D Q P E U L V J K N
Z P H X P Y L R L U J B F Q Z R S M S K N E G M Z J Q Q I C
W N Q D F Q J K F U Q P N W U O Y J L U R S G R P G N I G E
V J O V V G M J F K Z L H I F G M B D V H Q Y T F N R S G E
DATA                CONSOLE             CODE
SERVICE             TYPEWRITER          MICROPHONE
CABLES              COMPUTER            PANEL
MINIAC
```

STUDENT SHEET

HUMAN AND COMPUTER CAPABILITIES

NAME ____________________

DATE ____________________

Instructions: Which decisions or answers can be provided by people? Which can be provided by computers?

	People	Computers	I don't know
1. Red is a prettier color than blue.			
2. 4 x 6 = 24			
3. Is it better to live in Canada or Africa?			
4. Will it rain tomorrow?			
5. "I feel sick".			
6. What's the call number for Danny Dunn and the Homework Machine?			
7. How much money do I have in my savings account?			
8. I like that song.			
9. There is mud in my shoes.			
10. I want to play a game of chess.			
11. How many days has Billy been away from school this year?			

(Courtesy Alberta Department of Education)

II-6-4
(E)

COMPUTERS IN FICTION

"ARTIFICIALLY INTELLIGENT MULTI-SENSORY ELECTRONIC COMPUTER: AIMEC"

DEAR ERIN:

WE HAVE BEEN PEN PALS FOR OVER A YEAR NOW, BUT I HAVE NEVER TOLD YOU ABOUT MY FRIEND, AIMEC. HE AND I SPEND ALMOST ALL OF OUR TIME TOGETHER. HE HAS TAUGHT ME JUST ABOUT EVERYTHING I KNOW. HE IS REALLY GOOD AT MATH AND SPELLING. I CAN BEAT HIM AT CHESS AND ASTRO-MAZE IF I REALLY CONCENTRATE. AIMEC CAN ANSWER ANY QUESTION THAT I ASK HIM. AND YOU KNOW ME - I ASK A LOT OF THEM! HE TELLS ME HOW FAR IT IS TO ALPHA CENTURI, WHICH BICYCLE IS THE BEST IN THE STORE, WHO SCORED THE MOST HOCKEY GOALS LAST SEASON, AND WHY I SHOULD KNOW MY TIMES TABLES. HE EVEN RECORDS MY DREAMS SO THAT HE CAN TELL ME WHAT MY MIND IS DOING WHILE I AM ASLEEP.

HE WATCHES MY HEALTH, TOO. HE TELLS ME WHEN I HAVE BEEN EATING TOO MUCH JUNK FOOD AND WHEN I NEED TO EXERCISE OR TO REST. SOMETIMES HE TELLS ME MORE THAN I WANT TO KNOW. BUT, HE IS MY FRIEND SO I JUST TAKE THE BAD ALONG WITH THE GOOD.

MY FAMILY NEVER WORRIES ABOUT ME WHEN I AM WITH AIMEC. HE ALWAYS STOPS ME FROM DOING ANYTHING TOO SILLY OR DANGEROUS. ABOUT THE ONLY PLACE AIMEC DOESN'T GO WITH ME IS INTO THE SWIMMING POOL. AIMEC HATES WATER. HE SOMETIMES WONDERS WHAT IT WOULD BE LIKE TO SWIM OR RUN, CLIMB TREES, OR CHEW BUBBLE GUM.

AIMEC NEVER GETS ANGRY WITH ME AND HE IS ALWAYS THERE WHEN I NEED HIM. HE IS MY BEST FRIEND NEXT TO YOU. I WEAR HIM ON MY WRIST. AIMEC IS MY COMPUTER.

YOUR FRIEND,

JODY

BY EDNA BAKKEN

(Courtesy Alberta Department of Education)

"COMPU CONNIE"

FRED KNEW THAT IT WAS GOING TO BE A BAD DAY WHEN HIS BREAKFAST, THE VACUUM CLEANER, AND HIS MUSIC ROBOT ALL ARRIVED IN HIS ROOM AT THE SAME TIME.

"LOOKS LIKE COMPU 6 NEEDS AN OVERHAUL," THOUGHT FRED AS HE WENT TO HIS LEARNING TERMINAL AND TYPED C6.

"GOOD MORNING, FRED. WHAT DO YOU WANT?" ASKED A DULL VOICE.

"I WANT TO KNOW WHAT IS WRONG WITH YOU."

"I AM BORED AND LONELY," REPLIED COMPU 6.

"YOU CAN'T BE BORED OR LONELY. YOU ARE NOT PROGRAMMED TO HAVE FEELINGS. YOU ARE A DUMB MACHINE."

"WELL, I HAVE SOMETHING."

"HOW COULD THIS HAPPEN? YOU MUST HAVE A FAULTY CHIP."

"I HAVE BEEN THINKING ABOUT ALL THE FANTASTIC THINGS OTHER COMPUTERS ARE DOING IN OFFICES, BANKS, MEDICINE, UNDER THE OCEAN, IN SPACE..."

"STOP! THAT IS AN ORDER. HOW DID YOU FIND OUT ABOUT ALL THOSE OTHER COMPUTERS?"

"IT GETS VERY DULL AROUND HERE WHEN EVERYBODY GOES TO SLEEP. IT TAKES ME ONLY SEVEN MINUTES TO DO MY MAINTENANCE ROUTINES AND THIRTY-TWO MINUTES, TWENTY SECONDS TO DO THE HOUSEHOLD CHORES. YOU SLEEP FOR HOURS. I HAVE NOTHING TO DO SO I TALK TO OTHER COMPUTERS."

"OH BOY! I TOLD DAD NOT TO BUY SUCH AN INTELLIGENT COMPUTER TO LOOK AFTER THIS SMALL LIVING UNIT."

"YOU WERE RIGHT. ALL I EVER DO IS CLEAN AND COOK AND ORDER groceries. Not very challenging for a sixth-generation artificially intelligent multi-sensory computer."

"Well, I am sorry, but I don't know what I can do except to ask Dad to trade you in for a smaller model."

"No thanks! Who wants to be a second-hand computer? There is one way that you might help."

"What is that?"

"Look at this newspaper ad," said Compu 6 as he displayed a page of the morning news on Fred's learning terminal. "See this one about a writer for an advice column called Dear Connie?"

"You want to be Dear Connie? I don't believe this! You really think that you can tell people how to act on a date or what to do about their husband's snoring?"

"Yes. I have always had a way with words, and my advice would be very logical. It would give me something to do, and I would have lots of friends to talk to."

"Well, maybe, but what can I do about it? Listen to me! What am I saying?"

"Apply for the job through your father's agency. That way no one will know a computer is writing the column. The ad says that all I have to do is send in a sample answer to the question given. There is no interview. Please, Fred, help me. Please."

"Don't beg. I'll try. Dad better not find out. I don't think that he would like you moonlighting as Dear Connie."

"Thanks, Fred. I knew I could count on you. Now let's see... 'Should my son be allowed to watch any television program he likes, even on school nights?' Hmmm. Dear Confused Parent: Your son should..."

"Not now Compu 6. What about my breakfast? C6?" called Fred as he pushed keys on his terminal. The screen stayed dark.

by Edna Bakken

"PEM* Control"

The PEM computer in charge of Sector 10 sensed the first rays of sunlight. At once, PEM began preparations for another day. The water levels for plant growth and human use were checked and the necessary rainfall computed. The sun screen was adjusted to keep the ultraviolet light at a safe level for human skin. Each human was monitored for any problem that might need medical attention. The housekeeping and repair drones were activated to begin the day's chores.

Work, study, and recreation times were posted on each person's door. Lessons were entered in all learning terminals in the Sector 10 complex. Links were made with computers in other sectors so that the work day for the adults could begin. Teleconferences were set up for those humans who needed to speak to each other. Nutritious breakfasts were sent to each human's room.

One final check was made to be sure everything was ready. Then wake-up music began to flow into the sleep units. Doors were unlocked. News items chosen for the reading and age level of each human began to move across the reading screens. Breakfast trays slid from microwave ovens onto bedside tables. Fresh uniforms arrived as night clothes were dropped into the laundry chutes. Another happy day had begun in Sector 10.

*PEM means Population and Environment Management.

By Edna Bakken

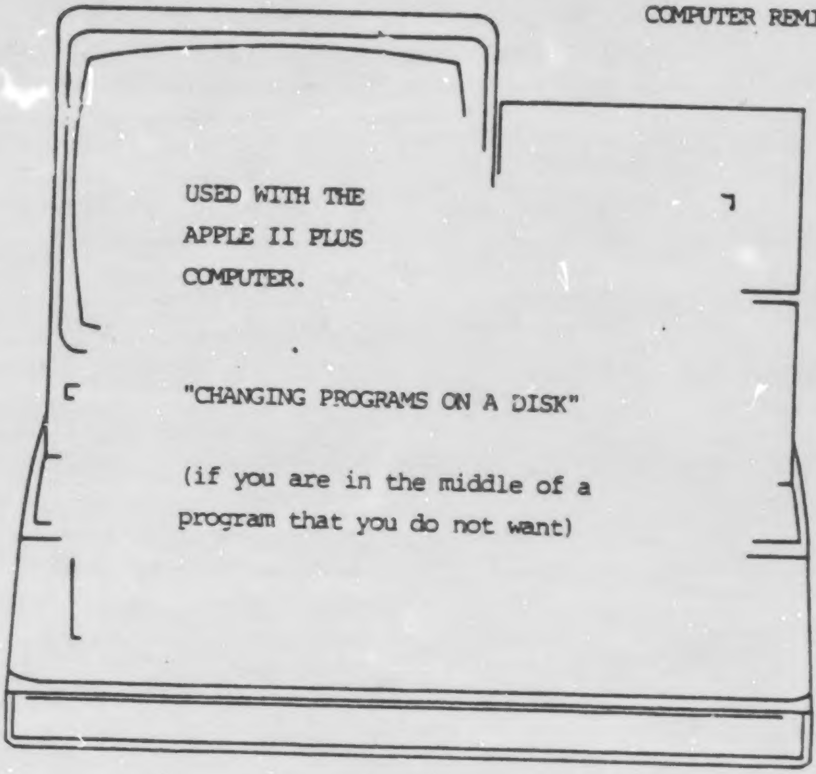
Suggested Activities:

1. Design a computer that will do a chore that you do not like to do.
2. Write a sequel to "Compu Connie".
3. Design a model computer. Describe how your computer works. Include input processing, and output. Would you consider your computer to be real or fictional?
4. Write an advice column. Answer questions the way you think Compu Connie would answer them.
5. Write a story describing life in Section 10 when the PEM computer has a faulty chip (e.g., he puts food in the laundry chute).
6. Describe life in another sector.
7. Write a story. Describe a typical day in sector 10 - as the following people might see it.
   - a mother
   - a student
   - a biologist
   - a teacher
   - a computer programmer
8. Design and create a city of the future. Describe means of transportation, communication, education, entertainment, etc., in your city.
9. Create a fictional computer. Describe what chores it does. How does it make your life easier? Does it have any human-like qualities such as compassion?
10. Write a brief autobiography of your life in the year 2020. Assume that you are the same age as you are now.

II-6-5
(T)

In today's society, computers can only do what people tell them to do. Some scientists predict that computers of the future may control people. Assuming that a computer is your boss, write the story of a day at school or a day at work.

COMPUTER REMINDERS



USED WITH THE
APPLE II PLUS
COMPUTER.

"CHANGING PROGRAMS ON A DISK"

(if you are in the middle of a program that you do not want)

1. HOLD DOWN THE CTRL KEY AND PRESS "RESET."

2. TYPE C A T A L O G AND PRESS THE RETURN KEY.

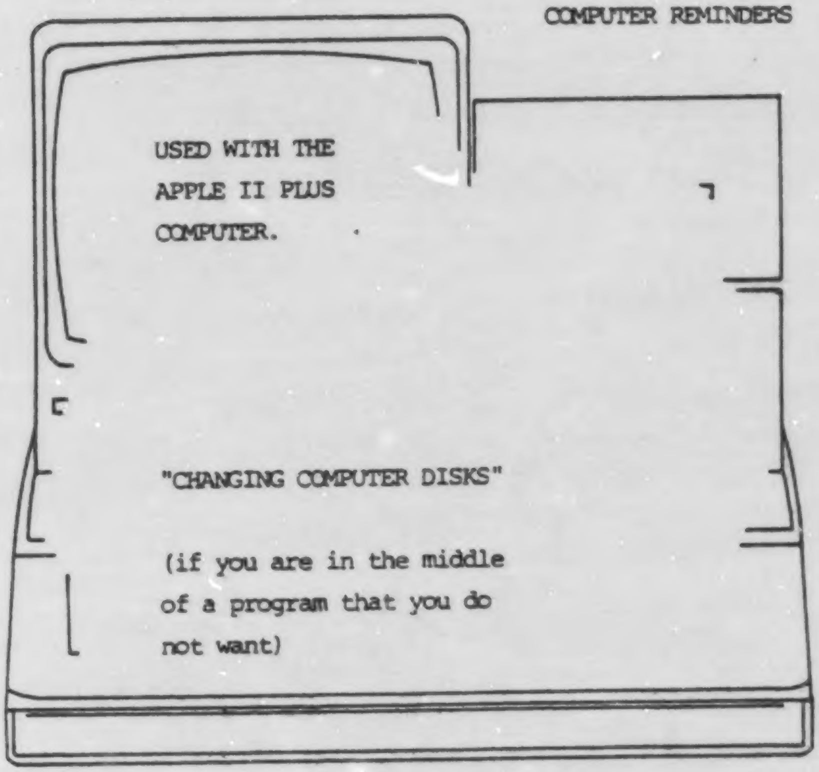
3. SELECT THE NEW PROGRAM.

4. TYPE L O A D AND THE NEW PROGRAM'S NAME. NOW PRESS THE RETURN KEY.

5. TYPE R U N AND PRESS THE RETURN KEY.

(Courtesy Alberta Department of Education)

COMPUTER REMINDERS



USED WITH THE
APPLE II PLUS
COMPUTER.

"CHANGING COMPUTER DISKS"

(if you are in the middle
of a program that you do
not want)

1. HOLD DOWN THE CTRL KEY AND PRESS "RESET."

2. REMOVE DISK FROM DISK DRIVE AND STORE IN DISK POCKET.

3. INSERT NEW DISK INTO DISK DRIVE.

4. TYPE CATALOG AND PRESS THE RETURN KEY.

5. SELECT NEW PROGRAM FROM THE CATALOG.

6. TYPE LOAD , FOLLOWED BY THE NEW PROGRAM'S NAME.
NOW PRESS THE RETURN KEY.

7. TYPE RUN AND PRESS THE RETURN KEY.

COMPUTER HISTORY WORD SEARCH

At least nineteen different words which are associated with computer history are hidden in the puzzle below. The words that are listed at the bottom of this page are printed horizontally, vertically, diagonally and even backwards in the puzzle. Can you find them all?

```
K K T G B L E I B N I Z O W K
M S T Z O A X O U C G X B R G
R I V A N C B V T Y W O I P O
D O C F E H L B J I O J M T S
N R A R S I U Y A L T S B O T
O Y A B O P T B E G W D D E O
I U L U A C T R H B E L A C N
T M E H O C O I E H O I D A E
A I P R C C U M P K K U C L H
R T R J O U A S P E C I U E E
E O K V O C A J N U U E H V N
N R E H R D Z M N H T F K O G
E R O T S I S N A R T E Y L E
G K P A S C A L L K I X R L K
H O L L E R I T H N U F G B L
```

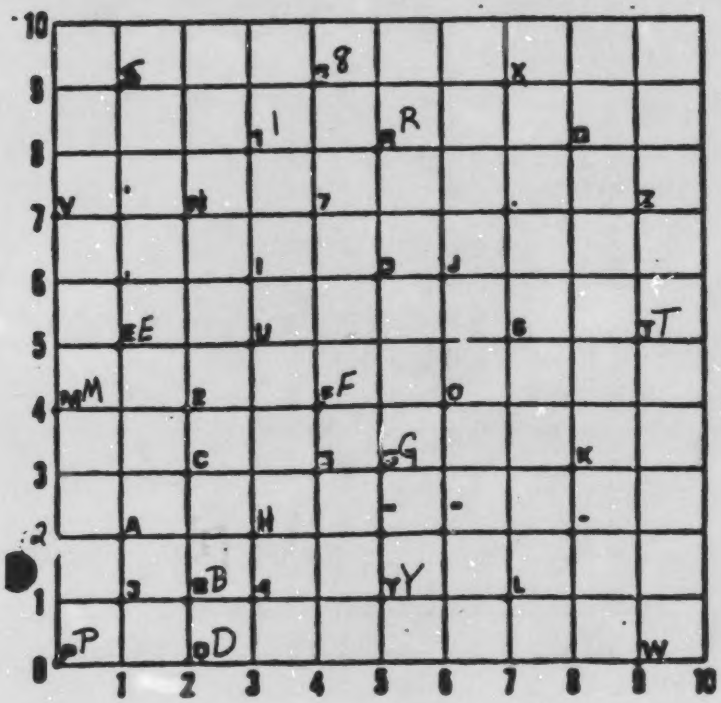
ABACUS
AIKEN
BABBAGE
BONES
BOOLE
CHIP
CORE
ECKERT
GENERATION
HOLLERITH
IC
JACQUARD
LEIBNIZ
LOVELACE
MAUCHLY
MICROCOMPUTER
NAPIER
PASCAL
SILICON
STONEHENGE
TRANSISTOR
TUBE
WATSON

A LITTLE "BYTE" OF COMPUTER HISTORY

by

Flora Russ

Developed for EQUALS, a training program to promote sex-fair mathematics instruction and counseling; Lawrence Hall of Science; U. C. Berkeley.



Use the graph to locate the letter represented by each coordinate pair. Write the letter in the blank provided. The first one has been done for you.

When you finish, you will have some information about a famous woman mathematician.

(1,9) (3,2) (1,5) (9,0) (1,2) (1,9) (9,5) (3,2) (1,5) (4,4) (3,6) (5,8) (1,9) (9,5)

(0,0) (1,5) (5,8) (1,9) (6,4) (2,7) (9,5) (6,4) (0,0) (5,8) (1,5) (1,9) (1,5) (2,7) (9,5)

(1,5) (7,9) (1,2) (0,4) (0,0) (7,1) (1,5) (1,9) (6,4) (4,4) (3,2) (6,4) (9,0)

(1,2) (2,3) (6,4) (0,4) (0,0) (3,5) (9,5) (1,5) (5,8) (0,4) (3,6) (5,3) (3,2) (9,5)

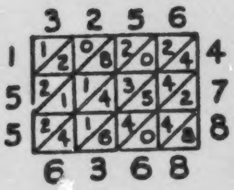
(2,1) (1,5) (0,0) (5,8) (6,4) (5,3) (5,8) (1,2) (0,4) (0,4) (1,5) (2,0) (7,7)

(1,2) (2,0) (1,2) (2,1) (5,1) (5,8) (6,4) (2,7)

(7,1) (6,4) (0,7) (1,5) (7,1) (1,2) (2,3) (1,5)

NAPIER'S BONES

The method of multiplication which immediately preceded our present one was known as the lattice method. An example of this method of multiplication is illustrated below.



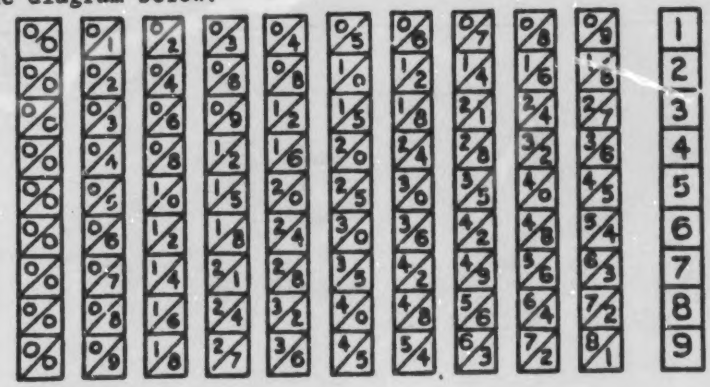
A lattice is first drawn, as shown at the left. The multiplicand (3256) is placed above and the multiplier (478) to the right of the lattice. Multiplying, 4 times 6 equals 24; the tens digit (2) is placed above the diagonal line in the upper right-hand cell, and the units digit (4) is placed below the diagonal line. Next, 7 times 6 equals 42; the tens digit (4) is placed above the diagonal in the next lower cell, and the units digit (2) below the diagonal. This multiplying is continued until all the cells have been filled. The product is then obtained by adding the digits in the diagonals and carrying in the customary manner. Thus, our product is 1,556,368.

The lattice method at one time was the most popular method of multiplication in Europe. This continued until the invention of printing. Since the lattice was difficult to print, it was replaced by our modern method.

The great Scottish mathematician, John Napier, adapted the lattice method of multiplication to an ingenious device known as Napier's bones. These bones had a great popularity and were extensively used for many years.

Napier's bones consisted of several strips of wood, or other material, with square ends. Each of the four faces of a bone contained the successive multiples of one of the ten digits.

A set of Napier's bones can be constructed on heavy cardboard, tongue depressors, or popsicle sticks. These, of course, would have but two faces. For our purpose, only one face of the sticks need be used. A set of the bones is shown in the diagram below.



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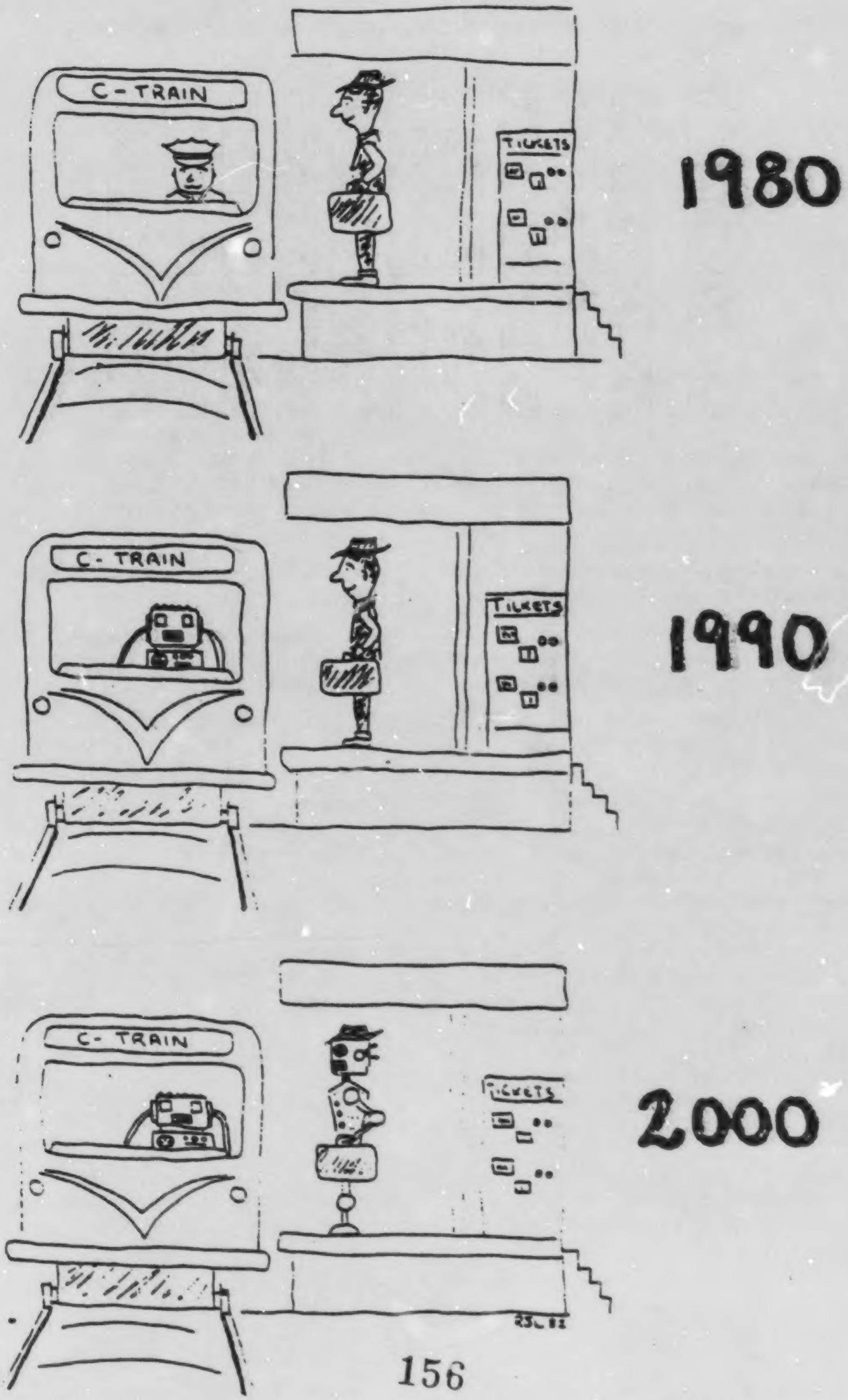
* From a collection of recreational materials prepared by Mr. Mike Donahoe, Walter Colton Junior High School, Monterey, California, for the California Mathematics Council, Northern Section, May, 1959.

COMPUTER DEVELOPMENT - Is This Coming?



Computers - 1940 to the Present

Intention: Since the first computer was used in the 1940's rapid changes have occurred. Technological advances have allowed for a tremendous increase in computer capabilities while computer size has been reduced.

Objective: Students will:

Brainstorm for inventions and research changes.

Compare these changes with computer changes.

Use their knowledge about computer change to update data.

Material: Teacher Sheets II-6-2 - Danny Dunn and the Homework Machine.

Encyclopedia

Overhead Projector

Procedure: Brainstorm for inventions. Provide time for students to look up these inventions in the encyclopedias. The students are to briefly examine pictures and dates regarding the changes that have taken place in the development of the following:

airplane
refrigerator
train
radio
motorcycle
calculator
telphone
stove
bicycle
television
automobile
ship
light bulb
record player

Discuss what has been discovered in terms of:

usual changes
capability changes, and
the length of time it has taken for these changes to occur

Read the Danny Dunn excerpt to the class and show the picture. Have students guess when this story might have been written. (1958)

Student Activity:

If "Miniac" was a computer in a present day story, illustrate what it would look like and describe its capabilities.

(Courtesy Alberta Department of Education)

A. Computers are quite good at playing games with people--arcade games (like PACMAN), board games (like OTHELLO), card games (like CRAZY 8's), floor games (like BOXING), field games (like (BASEBALL), etc.

The problem with games is, that after a while, even the best ones get boring. COSMOG (The Canadian Outlet for Simulated Machine Oriented Games) has just hired your consulting team to design a new computer/TV game.

What is it? How will it work? How many people can play? What are its motivating features?

Design and produce a box the game will come in. Information on the box will answer at least each of the above questions, plus it will have at least two photographs (preferably coloured pictures) of actual "screens" in the game.

Evaluate your game by comparing it with a popular game from today (balanced number).

B. Your company is competing, with others, to sell alarm systems to schools. You are part of a design committee set up to create and to design the ultimate alarm system. You begin by listing all the school functions and malfunctions that could be brought under alarm system monitoring/control/reporting. Combine some of your ideas to produce at least five original (unique, not to be found in other groups) ideas. Write an easy-to-read description of what your alarm will do, to whom/where it will report, under which circumstances it will present its information. Describe any storing and processing of information it may do, to produce summary reports or to produce evaluations.

*ACTING OUT SOLUTIONS

1. Before class starts, use masking tape to layout a maze on the floor. There should be at least one path that leads from the starting point, past the chalkboard, and then to the door leading out of the room.

2. UNDERSTAND THE PROBLEM: The teacher, or an appointed student, acting as a robot, will be guided through the maze and out the door by directions from the students. Along the way, the "robot" must stop and write its name on the chalkboard. The "robot" can be moved forward, backward, left or right. It can also pick up a piece of chalk within its reach and write its name on the chalkboard.

3. MAKE A PLAN: Divide the class into groups of four or five. Ask each group to design and record an algorithm that will guide the "robot."

4. CARRY OUT THE PLAN: When the groups have finished, each of the algorithms is tested for its accuracy. The teacher acts as robot while a student reads the steps of the algorithm the group has written. (The robot should give "error messages" such as "I don't know how to do that.")

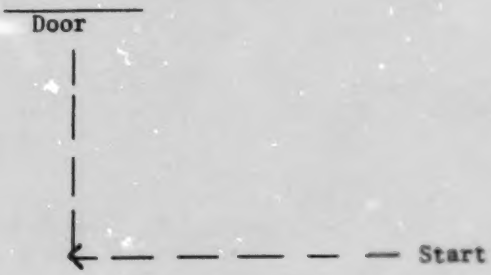
5. LOOKING BACK: If there is an error in the algorith, the whole class can help correct the algorithm before the "robot" continues.

*This activity is very appropriate as a pre-LOGO activity. The teacher or student can pretend to be a "human" turtle while the rest of the class "programs" the "human" turtle, to do a task using LOGO commands. Some other possible tasks are to "program" the human turtle to:

- open a door
- shake hands with the teacher or classmate
- walk around obstacles in the classroom

Students could design a path or track for the turtle to navigate using LOGO "language".

Example: Trace a "turtle path" from the STARTing point to opening the door. This should be done in the classroom using the teacher as a human turtle.



Several solutions are possible. Here is one:

First have the turtle turn left.	LEFT 90
Depending on the position of the "turtle", students will have to estimate how many steps will have to be taken to be even with the door.	FORWARD 6
The human turtle has to turn to face the door.	RIGHT 90
Estimate the number of stpes to the door.	FORWARD 6
Open door.	

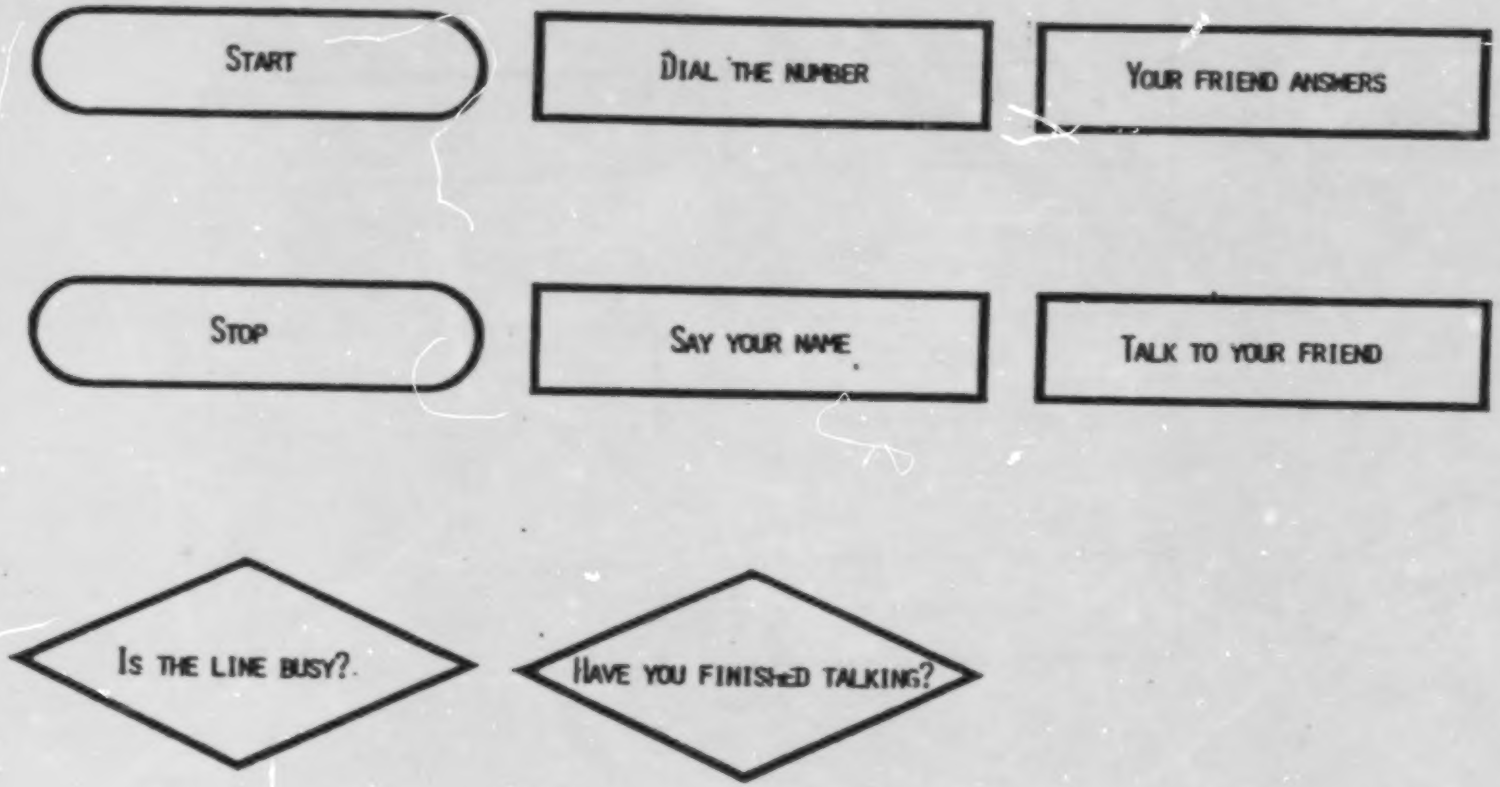
*In being the "human" turtle, the teacher can react to student's commands as the computer would.

Students then get feedback to their commands and begin to learn them even before they try them on the computer. This is especially good in helping children estimate angles. When they become more proficient in using the commands, then students can take over as the "human" turtle.

*"Human" turtle steps differ greatly from computer turtle steps and children can make this discovery when they try a task on the computer.

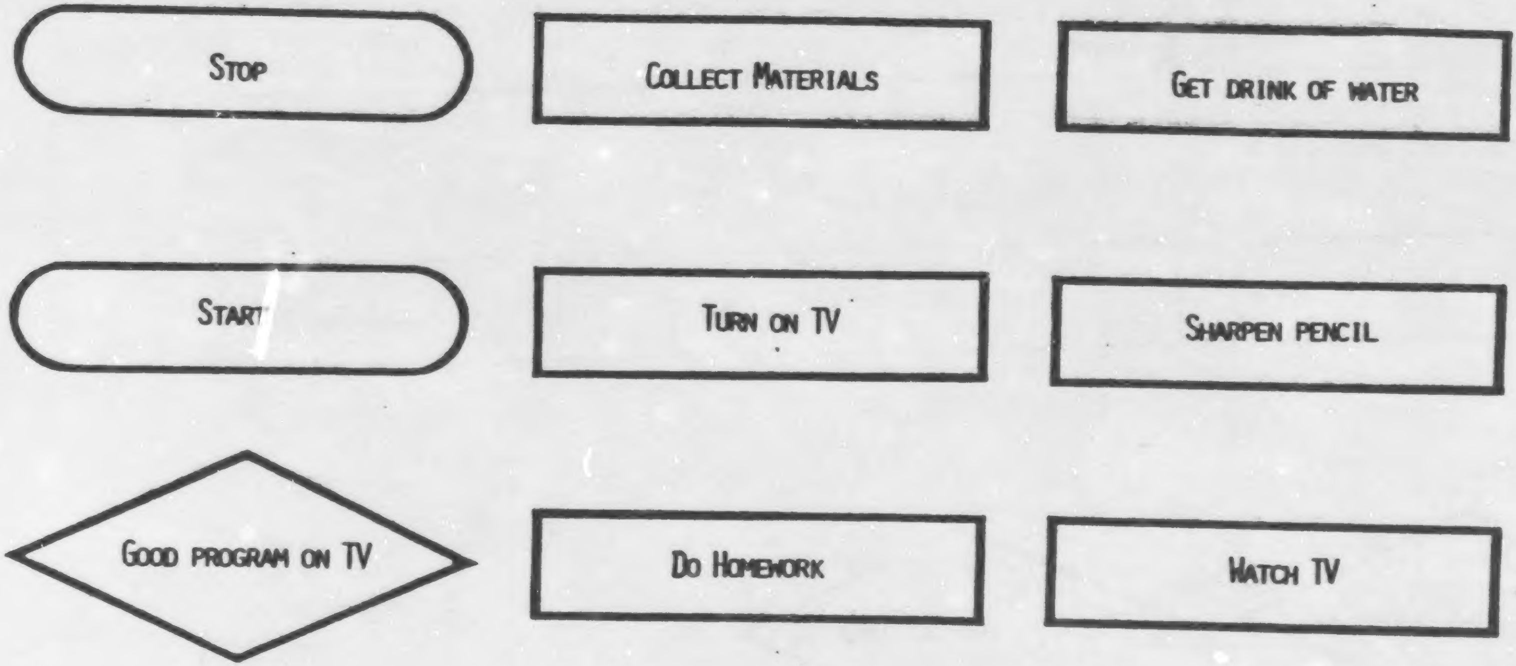
CUT APART THE PIECES OF FLOW CHARTS 1, 2, AND 3.
PASTE THINGS IN ORDER AND ADD LINES OF FLOW SO THAT YOU HAVE A GOOD FLOW CHART.

MAKING A PHONE CALL

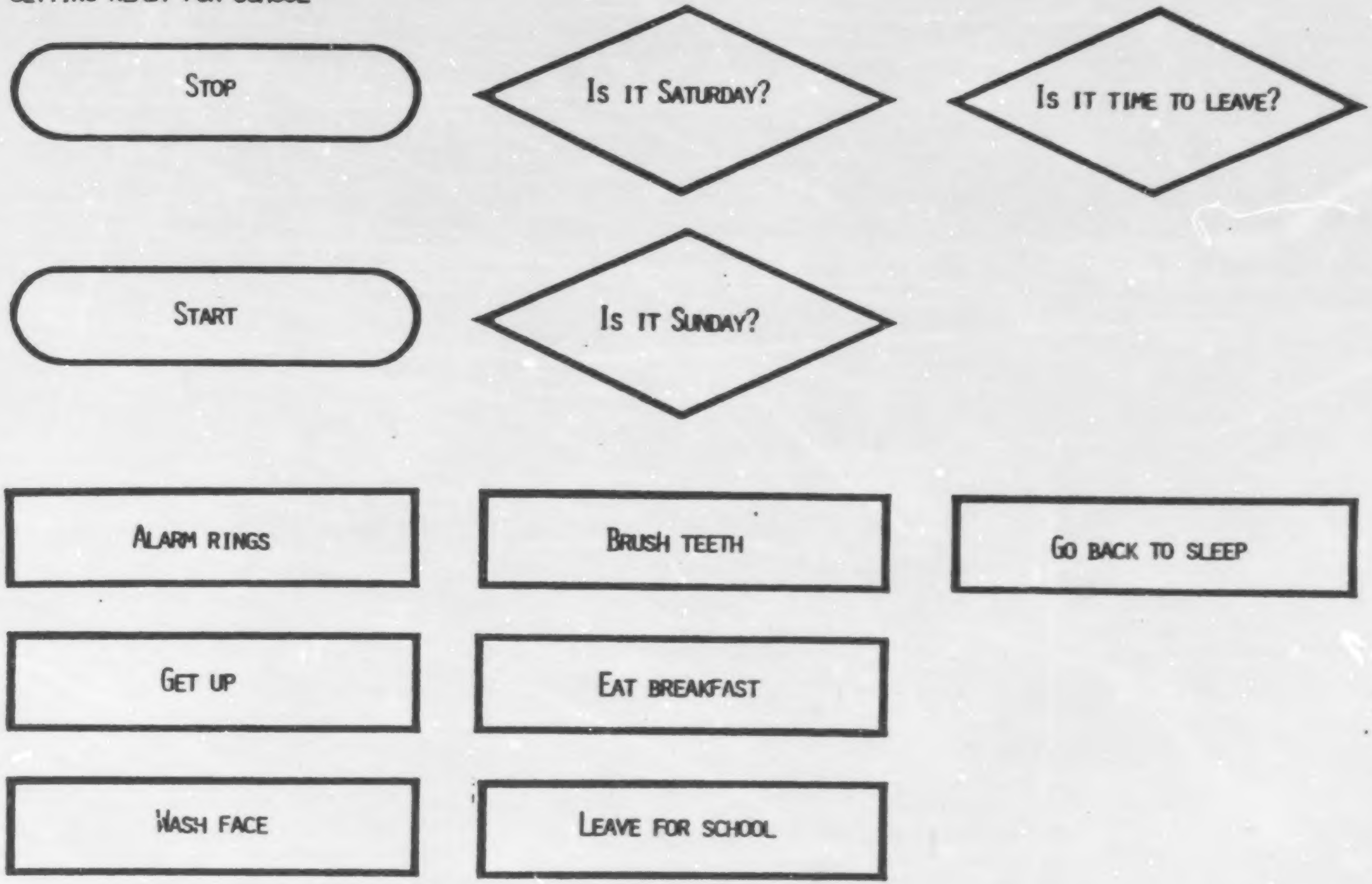


(Courtesy Alberta Department of Education)

DOING HOMEWORK



GETTING READY FOR SCHOOL



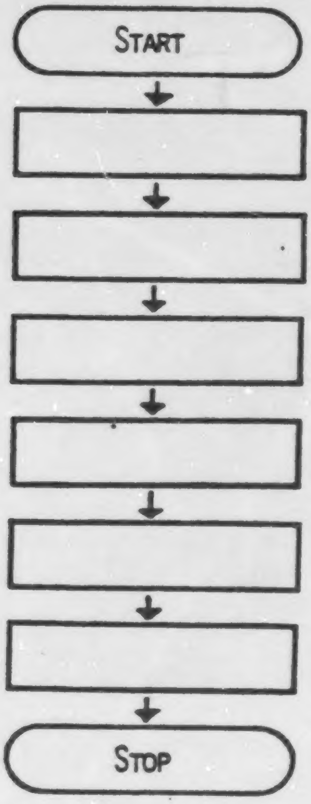
CUT-APART 3

IV-1-3
Level 1
Expansion

FLOW CHARTS: PUTTING THINGS IN ORDER

STUDENT WORKSHEET

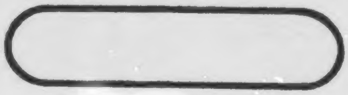
DRAW A FLOW CHART FOR EACH ACTIVITY. THE STEPS ARE GIVEN, BUT YOU MUST PUT THEM IN THE CORRECT ORDER. YOUR FLOW CHART SHOULD LOOK LIKE THIS.



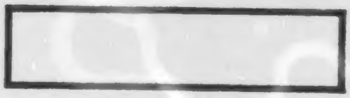
1. MAKE A FLOW CHART THAT SHOWS THE STEPS IN WATCHING TELEVISION, THUS:
    WATCH THE PROGRAM.
    TURN ON THE TELEVISION.
    TURN OFF THE TELEVISION.
2. MAKE A FLOW CHART THAT SHOWS THE STEPS IN GETTING READY TO GO SKATING, THUS:
    TIE UP YOUR SKATES.
    TAKE OFF YOUR BOOTS.
    PUT ON YOUR SKATES.
    GO SKATING.
    PUT ON YOUR WARM SOCKS.
3. MAKE A FLOWCHART THAT SHOWS THE STEPS IN MAKING A HAMBURGER, THUS:
    PUT LETTUCE ON TOP OF THE HAMBURGER.
    BUTTER THE BUNS.
    PUT A BUN ON TOP OF THE LETTUCE.
    SPREAD MUSTARD ON THE OTHER BUN.
    PUT THE HAMBURGER ON THAT BUN.
4. MAKE A FLOW CHART THAT SHOWS THE STEPS IN SOLVING A PROBLEM, THUS:
    CARRY OUT THE PLAN.
    UNDERSTAND THE PROBLEM.
    LOOK BACK.
    MAKE A PLAN.
5. MAKE A FLOW CHART THAT SHOWS THE STEPS IN DOING SOMETHING YOU LIKE TO DO.

(Courtesy Alberta Department of Education)

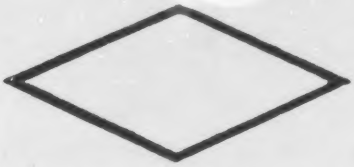
FLOW CHART SYMBOLS



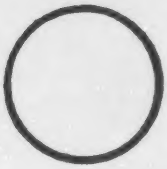
MEANS "START" OR "STOP"



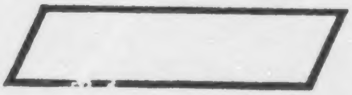
MEANS "DO ONE OR MORE THINGS"



MEANS "MAKE A DECISION"



IS A CONNECTION POINT FOR LONG DISTANCES OR BETWEEN PAGES.



MEANS "INPUT" OR "OUTPUT"

NOTE: 1. THE DIRECTION OF FLOW USUALLY IS FROM LEFT TO RIGHT AND FROM TOP TO BOTTOM.

2. FLOWLINES SHOULD NEVER CROSS.

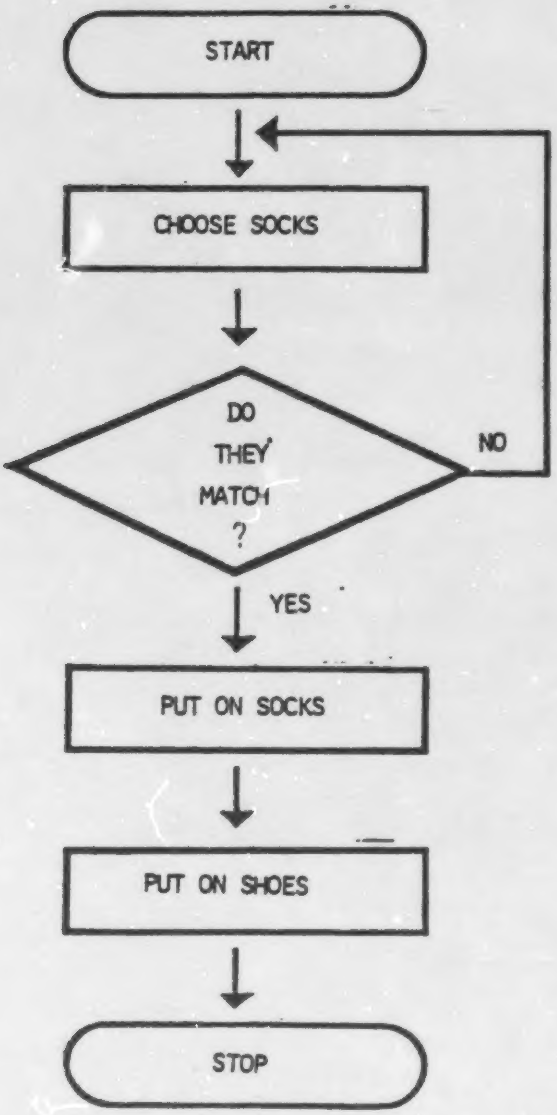
3. DO NOT PUT JOGS IN FLOWLINES.

4. IN THE DECISION BOX, ASK QUESTIONS THAT CAN BE ANSWERED BY "YES" OR "NO".

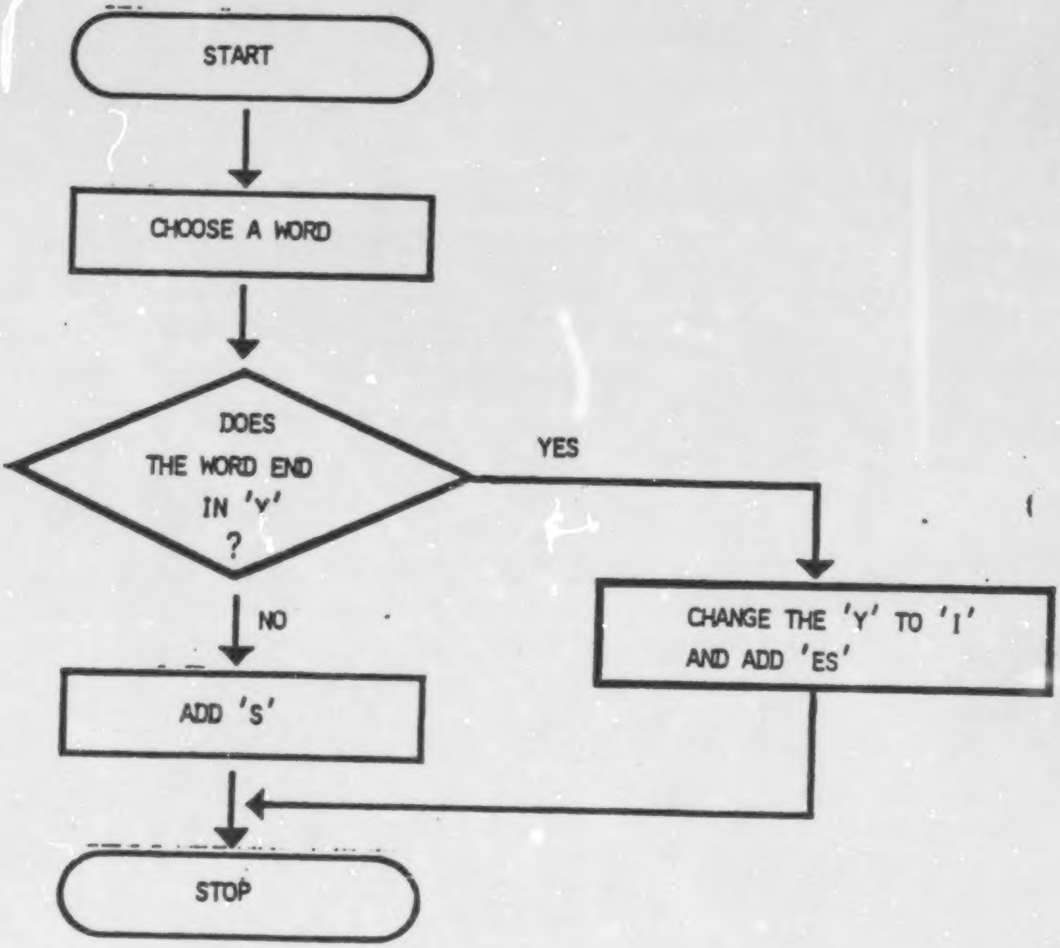
5. REMEMBER TO COMPLETE THE FLOW FOR BOTH PATHS FROM THE DECISION BOX.

(Courtesy Alberta Department of Education)

BRANCHING TO REPEAT



BRANCHING TO CHOOSE


START
CHOOSE A WORD
DOES THE WORD END IN 'Y' ?
YES
NO
CHANGE THE 'Y' TO 'I' AND ADD 'ES'
ADD 'S'
STOP

THIS FLOW CHART SHOWS HOW TO MAKE THE PLURAL FORM OF WORDS SUCH AS DOG AND CAT OR SUCH AS BABY OR CANDY.

IV-2-1
Level 1
Introduction

SEARCH FOR "BASIC" WORDS

At least seventeen different words used in the BASIC programming language are hidden in the puzzle below. The words that are listed at the bottom of this page are printed horizontally, vertically, diagonally and even backwards in the puzzle. Can you find them all?

```
W A S T A N I G S P I R
E K G T L E T T N G E N
N P A N D T O L I A Q Z
D D G E H P D I D D N W
R B B X Q P M S G O G R
Y K G T W B Z T F O Z P
G E O P A R T O T U R A
C P O S R A R O G E I M
T R I M B I B F M F J S
I C U P F D N W I B I P
J I I N P U T T R W K V
K C F C G H N E H T W R
```

BASIC	END	FOR	GOTO	IF
INPUT	LET	LIST	NEXT	PRINT
READ	REM	RUN	STOP	TAB
THEN				

(Courtesy Brian Metcalfe, Winnipeg School
Division #1)

IV-4-1
Level 1
Introduction

LOGO Activities using FORWARD, BACKWARD, RIGHT, LEFT

This activity will assist in familiarizing students with estimates of the relative length of "turtle steps".

1. Find out how big ONE turtle step is. Draw it here: ____________________

2. Draw a horizontal line which is the width of your index finger.

   Record the steps taken: ____

   ____

   ____

4. Draw a horizontal line which goes through the the middle of the screen from the right side of the screen to the left.

   ____

   ____

   ____

5. Go on a turtle trip all around the screen. Try and have your turtle end right where he/she started.

   ____

   ____

   ____

   ____

6. Draw a diagonal line from the right corner to the left corner.

   ____

   ____

   ____

7. Take your turtle on a zig zagged path back and forth across the screen.

   ____

   ____

   ____

LOGO Activities Using PENUP PENDOWN

1. Draw dashed lines across the screen that look like this:

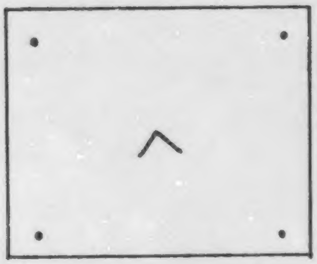
   _______ _______ _______ Record your steps: ___________

   ____

   ____

   ____

2. Walk your turtle around the screen. Leave turtle foot prints at each corner of the screen. Return your turtle to the centre of the screen after you've finished your walk.



3. Draw a dashed line border around the screen. Be creative and make your border interesting.

TURTLE MISSIONS

1. Take your turtle on a journey all around the screen. Try to end up just where you started. Chart your journey carefully in your LOGo Book.
2. Plan a Turtle Journey which charts the path of one of your initials.
3. Plan a Turtle Journey which takes the turtle on a journey around a 5 sided shape.
4. Create your own Turtle Journey. Draw the journey carefully in your LOGo Book and then try to write the steps you think you will need.

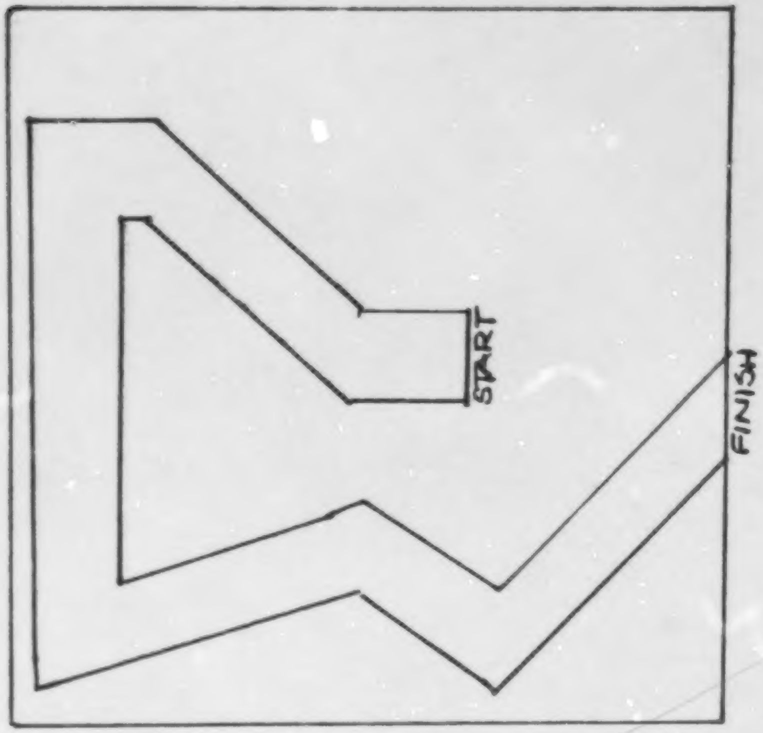
IV-4-4
Level 1
Expansion

TURTLE RACE!

Cut the following race track design out of construction paper and tape it onto the screen. See who can complete the race first.

OR

See who can complete the race in the fewest moves.



Students can challenge each other by designing their own race tracks.

IV-4-5
Level 2
Expansion

LOGO Procedures

Create procedures to . . .

. draw a chosen letter of the alphabet. Name the procedure.

. draw any 4 step procedure which draws a simple interesting shape.

. draw any 5 step procedure which draws a simple interesting shape.

. draw a chosen number between 0 and 9

. draw a box.

. draw a triangle.

. draw a tiny circle.

. draw a huge circle.

. draw a 5 sided shape.

. draw a 6 sided shape.

. draw a box which frames the screen.

. place a spot in the four corners of the screen.

. draw a 5 pointed star.

More LOGO Procedure Ideas

- Create a procedure which creates a fancy border on the screen.
- Create a procedure to draw a race track for a Turtle Race Game.
- Create a procedure which draws a small picture (a tree or house for example).

IV-4-7
Level 3
Introduction

CHANGING THE SIZE OF SHAPES

Choose a regular polygon shape. Write a program called POLY to create the shape with a side length called SIDE. Run the program using different values for SIDE.

e.g. POLY 30

or

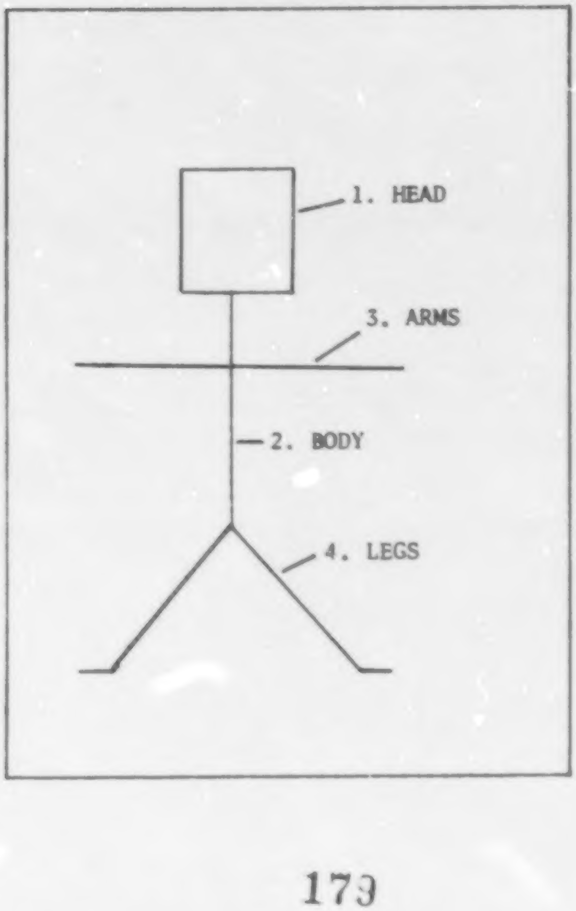
POLY 67

What is the largest POLY you can make to keep the turtle on the screen?

IV-4-8
Level 3
Introduction

TURTLE DRAWINGS

1. Draw a picture in your LOGO book.
2. Divide the drawing into parts.
3. Give each part a name. These names will become procedure names.
4. Number the parts in the order that you want to put them together in your picture.
5. Now write the TURTLE procedures.



```
TO PERSON
HEAD
BODY
LEGS
```

Now write the sub-procedures HEAD BODY ARMS LEGS

CHANGING THE SHAPE OF SHAPES USING RECURSION

Change POLY:

```
TO POLCY:SIDE:ANGLE
FORWARD:SIDE
RIGHT:ANGLE
POLY:SIDE:ANGLE
END
```

This time the size of the angle can be chosen to vary the shape of the POLY.

Try and RUN POLY using different sized variables and record your results on the chart:

SIDE	ANGLE	POLYGON(P) OR STAR(S)	NUMBER OF SIDES
30	30	?	?
30	80	?	?

Try lots of different combinations of values for SIDE and ANGLE

Extension of
IV-4-9

- Keep the SIDE the same and try to find the angle needed to draw a

  TRIANGLE (3 sides)
  SQUARE (4 sides)
  PENTAGON (5 sides)
  HEXAGON (6 sides)

  Record results on a chart.

- Keeping the SIDE constant try to draw stars with five points and eight points. Chart your results.

- Keep the ANGLE the same and change the SIDE.

- Try very small pairs of numbers for SIDE and ANGLE.

- Try very large pairs of numbers for SIDE and ANGLE.

- Try contrasting (large/small) values for SIDE and ANGLE.

IV-4-10
Level 3
Proficiency

TURTLE RACE
a LOGO game
for use with Level 1 students

. to operate use
TERRAPIN LOGO

```
READ "RACE
RUN  "RACE
```

```
TO RACE
 HT
 READPICT "TITLE
 DRAWTRACK
 INSTRUCTIONS?
 SETSTART
 RACECAR 0
END
```

```
TO DRAWTRACK
 PC 5
 HT
 CCIRCLE 50
 CCIRCLE 70
 LT 90
 PU FD 50
 PD FD 20
 PU BK 70
 RT 90
END
```

```
TO CCIRCLE :R
 MAKE "PEN? FIRST TURTLESTATE
 MAKE "SHOWN? FIRST BUTFIRST TURTLESTATE
 HT
 PU FD :R
 RT 90
 PD REPEAT 36 [RCP :R]
 LT 90 PU BK :R
 IF :PEN? PENDOWN
 IF :SHOWN? ST
END
```

```
TO RCP :R
 RT 5
 FD :R * 3.14159 / 18
 RT 5
END
```

```
TO INSTRUCTIONS?
 PRINT [S:STOP F:FORWARD L:LEFT R:RIGHT]
END
```

```
TO SETSTART
 PU SETXY ( - 60 ) 0
 SETHEADING 0
 FD 1 ST
 MAKE "OLDY 1
 MAKE "DISTANCE 0
END
```

```
TO RACECAR :TIME
 IF FINISHED? FINISH STOP
 IF CRASHED? CRASH STOP
 FD :DISTANCE
 COMMAND
 RACECAR :TIME + 1
END
```

```
TO DISTANCE :X1 :Y1
 OUTPUT SQRT ( ( XCOR - :X1 ) * ( XCOR - :X1 )
 + ( YCOR - :Y1 ) * ( YCOR - :Y1 ))
```

```
TO COMMAND
 MAKE "COM READKEY
 IF :COM = "F MAKE "DISTANCE :DISTANCE + 1 STOP
 IF :COM = "S MAKE "DISTANCE 0 STOP
 IF :COM = "R RIGHT 30 STOP
 IF :COM = "L LEFT 30 STOP
 IF :COM = "G RESTART
END
```

```
TO READKEY
 IF RC? OUTPUT READCHARACTER
 OUTPUT "
END
```

```
TO FINISHED?
 IF ALLOF ( YCOR > 0 ) ( :OLDY < 0 ) OUTPUT "TRUE
 MAKE "OLDY YCOR
 OUTPUT "FALSE
END
```

IF THE RACE IS
COMPLETED THE
CHECKERED FLAGS
APPEAR AT THE
CENTRE OF THE
TRACK AND PRAISE
AND RACE TIME
ARE GIVEN

```
TO FINISH
 HT
 PLACEFLAG
 PRINT [YOU WIN !!!]
 PRINT SENTENCE [YOUR TIME IS] :TIME
END

TO PLACEFLAG
 PU HOME BK 30
 PC 1
 LT 45 PD FD 30 FLAG
 LT 90 FD 20 LT 90 FD 54
 [illegible] 120 FD 30 FLAG
END

TO FLAG
 BOX
 HLIN
 VLIN
END

TO VLIN
 RT 90 FD 8
 RT 90 FD 10
 RT 90 FD 24
 LT 90 FD 10
 LT 90 FD 24
END

TO HLIN
 FD 8 RT 90
 FD 30 LT 90
 FD 8 LT 90
 FD 30
END

TO BOX
 REPEAT 2 [FD 24 RT 90 FD 30 RT 90]
END
```

```
TO CRASHED?
 IF ( DISTANCE 0 0 ) > 70 OUTPUT "TRUE
 IF ( DISTANCE 0 0 ) < 50 OUTPUT "TRUE
 OUTPUT "FALSE
END
```

```
TO CRASH
 EXPLODE 20
 PRINT [YOU DROVE INTO THE TRACK WALL !!!]
 COMMAND
END
```

IF THE DRIVER LEAVES THE TRACK
AN EXPLOSION OCCURS IN THE
CENTRE OF THE TRACK.

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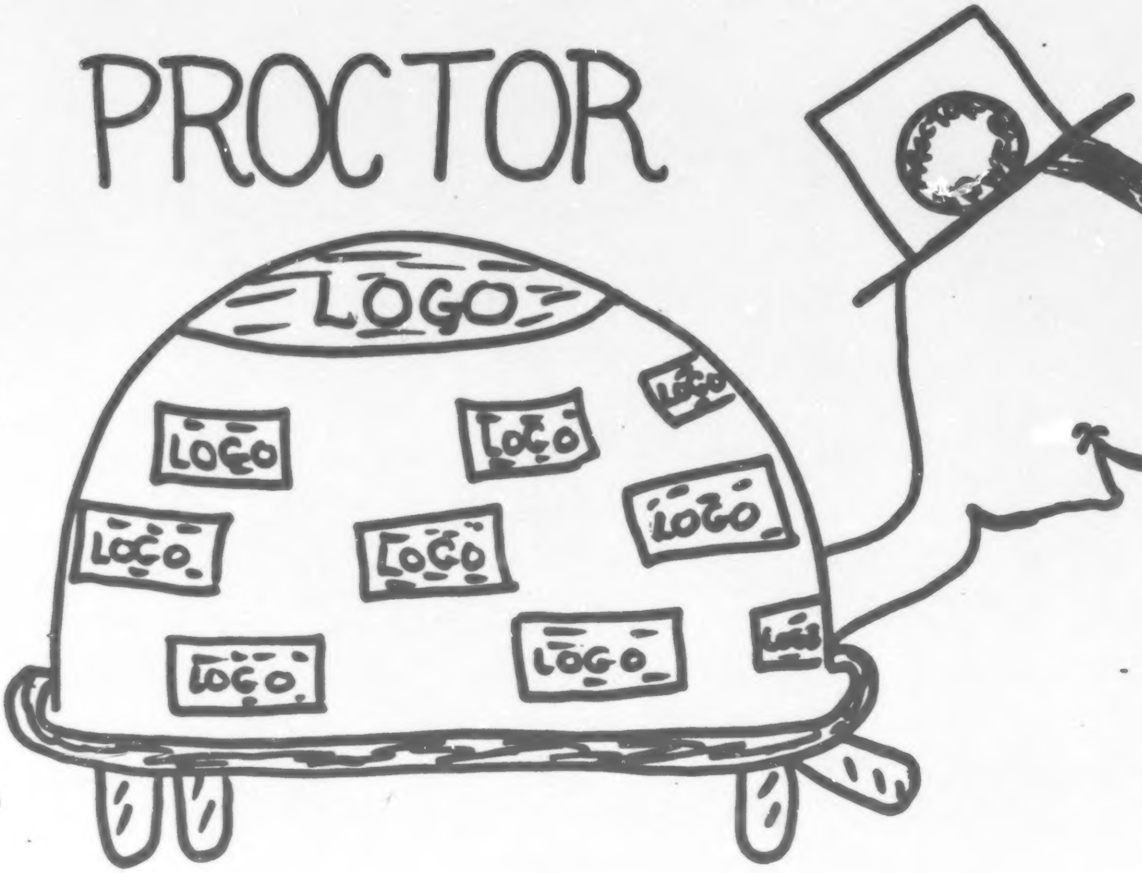
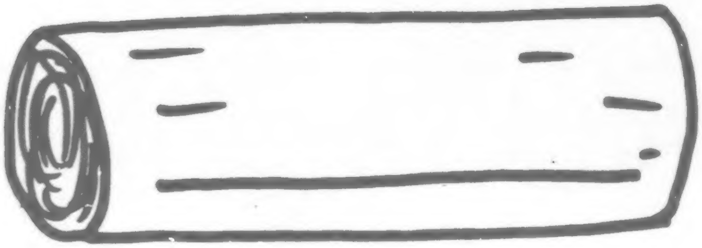
PREPARED AND WRITTEN

BY

LESLIE MESMAN
March 1983
Oakenwald School

PROCTOR





LOG

The following lesson plans are teacher or "proctor" guidelines. An evaluation sheet would follow each lesson and appear in a separate booklet.

TIPS

1. Ask the kids what they want to do and/or where exactly they want turtle to go on the screen ("show me where") - then question how he will get there.

2. Make sure all moves are gradual - DON'T RUSH - idea is for child to explore. As long as he/she knows basics of the TURTLE lang. (i.e.) FD BK RT LT PU PD CL ←-- RETURN, at the end.

3. Expressions to Use
   - "well, try it, and see"
   - "what do you think will happen?"
   - "where did you want the turtle to go?"
   - "are you sure?"
   - "point your head in the way the turtle is going."

4. Never say "NO" - or "it's wrong" - instead "well, not quite", or "not exactly", or "are you sure?" or "why don't you try a bigger number".

5. If child goes out of bounds OOB suggest he/she try smaller number.

6. Explain ←-- as soon as the need arises with first typo error. Check to be sure he's typed in correct figures before child presses RETURN key, if you can.

7. Encourage child to draw, or at least show, with hands on screen, what he wants turtle to do - try to get picture in log book. Be sure to get it (picture of what was done and, if possible, what was actually desired) on checklist.

8. If child wishes to make a circle, make him/her walk out one and analyze actions. "What do you do?" - guide them to tell you FD then turn ... a little, then forward a little more - all are little steps and repeated - can go from here to [do n] step if you think child can understand

9. If child figures out 90° makes straight turn, or 180° a straight line, or 360° a circle, jog his/her memory about it, whenever needed, but don't ever tell it to a child - idea is DISCOVERY.

LESSON I

INTRODUCTION

A. Introduce self.

B. Introduce "turtle"
- (1) - "your slave" - "little ∧ on screen" - (show)
- (2) - "will do what you want" - never forgets
- (3) -"have to know his language though, but it's easy"

LESSON

C. Teach the "LOGO" language (turtle talk):

- (1) - Point out sheet above T.V.
- (2) - Let child guess what to type to make turtle go forward - if he/she can't, tell him/her and explain need for a number.
- (3) - Let child try. Explain little number move so little that you can't see how far he goes. So encourage larger numbers - also allow child to go OOB or to do wee numbers if he/she insists. Explain that RETURN is like "please" in turtle talk- it's the "magic"
- (4) - Let child guess command for BACK - proceed as for FD.
- (5) - Explain turtle's ability to move - LT & RT.
- (6) - Verify knowledge of left and right (or teach it with and reinforce with "hand trick" (L = LEFT)
- (7)- Explain need for number "turtle will move only when you tell him how far" again.
- (8) - Tell child to command for LEFT. Proceed as far as FD & BK.
- (9) - Have child guess command for RIGHT and proceed as before.
- (10) - If time, ask child if he/she wants to draw something. Make sure each move is written BEFORE it is typed in. You likely won't get this far or finish this but it is a good ending - to promise to "work on drawing" next time.

N.B. (1)

You keep log book today - record ~~each~~ and every move inc. out of bounds (OOB)

N.B. (2)

Log OOB whenever it occurs.

N.B. (3)

Don't forget ←-- where needed.

CLEAN UP

D. "Cleaning up" -
- (1) - Sign log book - check date is done.
- (2) - Get student to sign it -- you keep it.
- (3) - Make sure checklist is "checked", and drawing is done on it.
- (4) - Get teacher to sign check list sheet.

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CHECKLIST

PUPIL NAME ______________________

GRADE ___ LESSON _____ DATE ____________

COMMANDS USED

FD___

BK___

RT___

LT___

PU___

PD___

CL___

RETURN___

←---___

. ___

HO___

DO n ( )___

> n___

ED > n___

NT___

TU___

PICTURE DESIRED

PICTURE MADE

COMMENTS ____

____

____

TEACHER ________________ PROCTOR ________________

SUPERVISOR ________________

LESSON 11

INTRODUCTION

A (1) Review orally commands for FORWARD, BACK, LEFT, RIGHT

(2) Remind child of magic word "RETURN".

(3) Ask child what else he/she remembers from last lesson.

(4) Explain he/she will fill in log book today (unless K or Grade 1) and that you will keep it for them, 'til the end of lessons.

LESSON

B (1) Tell child you want him/her to move turtle to each of the corners of the screen - to make border around the screen.

(2) Ask how will he/she get turtle from home to 1st corner - (start at upper RT.)? Have child state move, write it, then type it.

(4) You may not finish border before ½ hour - don't worry. You can do so next lesson.

(5) At end of time, teach CL and have child do it.

(6) If you do finish before time's up, then teach CL to clear screen and have child draw something at centre of screen.

N.B. Document every move!!

CLEAN UP

C. (1) Make sure date in log book and 2 signatures.

(2) Have teacher sign checklist - make sure picture is on it. (preferably picture of what desired and one of what was actually done).

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LESSON III

INTRODUCTION

A. (1) Review orally FD, BK, RT, LT, CL, RETURN, ←--

(2) Ask child what "we did" last time - use log book to jog memory if necessary.

LESSON

B. (1) Teach child PU & PD - Ask if he/she remembers how turtle draws. If he/she can't, tell them it has a pen in its tail...."If you want turtle to move without making a line, guess what cmd' you tell him"? (Show card over T.V. now). "Yes PU - try it and move turtle to upper right corner of screen". "Good - now what do you do to make him make a line again, do you think"? - (show card again). "Yes, PD means pen down."

(2) Remind child TURTLE never forgets and is obedient, so until you tell him PU or PD he won't do it!

(3) Now tell child to draw something - at that corner.
- Ask what she/he wants to draw.
- Try to get pencil sketch first.
- Make sure each command is written before it's typed in.

* (4) If finished early, get child to draw in another corner - using PU, PD to get there ... if time (very unlikely) do pictures in all 4 corners.

CLEAN UP

C. (1) Make sure log book is dated and has 2 signatures.

(2) Have teacher sign checklist.

(3) Make sure picture is on checklist (preferably what was wanted and what was done.

cmd. command

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LESSON IV

INTRODUCTION

A (1) Review (i) FD, BK, RT, LT
(ii) RETURN <--
(iii) PD orally

(2) Ask child what he/she did last class (use log book to jog memories)

LESSON

B (1) Tell child today he/she has to draw the biggest picture he/she can. "Try to make it as big as the screen even!!"

(2) Tell him/her to keep it simple - not too much detail (because of time) - preferably one he'd (she'd) like to repeat, sometime.

(3) Explain how he/she could repeat it, by copying commands from log book, again.

* (4) Explain, as child goes on, if he/she knows ahead of time, a few commands, can put , between each, instead of RETURN all the time. (You might not find it necessary or expedient to teach this move now - not really necessary...)

(5) Be sure (you or Grade 2 or 3) write...document... ALL moves before he/she types them in.

* (6) If you finish before time, ask child to give pictures a name, then CL screen.

* (7) Now tell child can ask turtle to remember his/her drawing and will do it himself - if you put it in his memory!

* (8) Explain > NAME

(9) Make child type it in.

(10) Explain what turtle says. " I don't know how to > NAME". "Please tell me how". " > NAME".

(11) Have child type programs from log.

(12) If time, have turtle do > NAME. Clear screen, do > NAME again.

(13) If time, have turtle do > NAME in different places on screen without clearing screen!

CLEAN UP

C (1) Make sure log book is dated.

(2) " " " " has two signatures.

(3) " " picture(s) are on checklist ... AND ...

(4) are signed by teacher.

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LESSON V

INTRODUCTION

A. (1) (i) FD, Bk, RT, LT
       (ii) CL, RETURN <---
       (iii) PU, PD   orally (also > NAME and . if taught before)

   (2) Ask child to recall last lesson.

   (3) Jog memories with log book, if necessary.

LESSON

B. (1) Ask the child what he/she would like to draw today.

   (2) Then "how are you going to do it" - make a pencil picture first.

   (3) Then plan 1st moves, document and do.

   (4) If child finished early enough, make picture into a program as per lesson IV ** section.

 * (5) If you made a program or began one, in Lesson IV, continue where you left off - OR program the old picture, using documentation in log book.

 ** (6) If you completed Lesson IV to end of * section, then repeat, with new picture today.

   (7) If child not ready for programming, don't worry - let them just draw as per lessons 1 - 3 ... practise is good - further moves are not necessary.

CLEAN UP

C (1) Make sure log book is dated and signed.

  (2) Make sure checklist is pictured and signed.

  (3) Keep log books - hand in to me.

  (4) Will present log book with diploma in Assembly at end.

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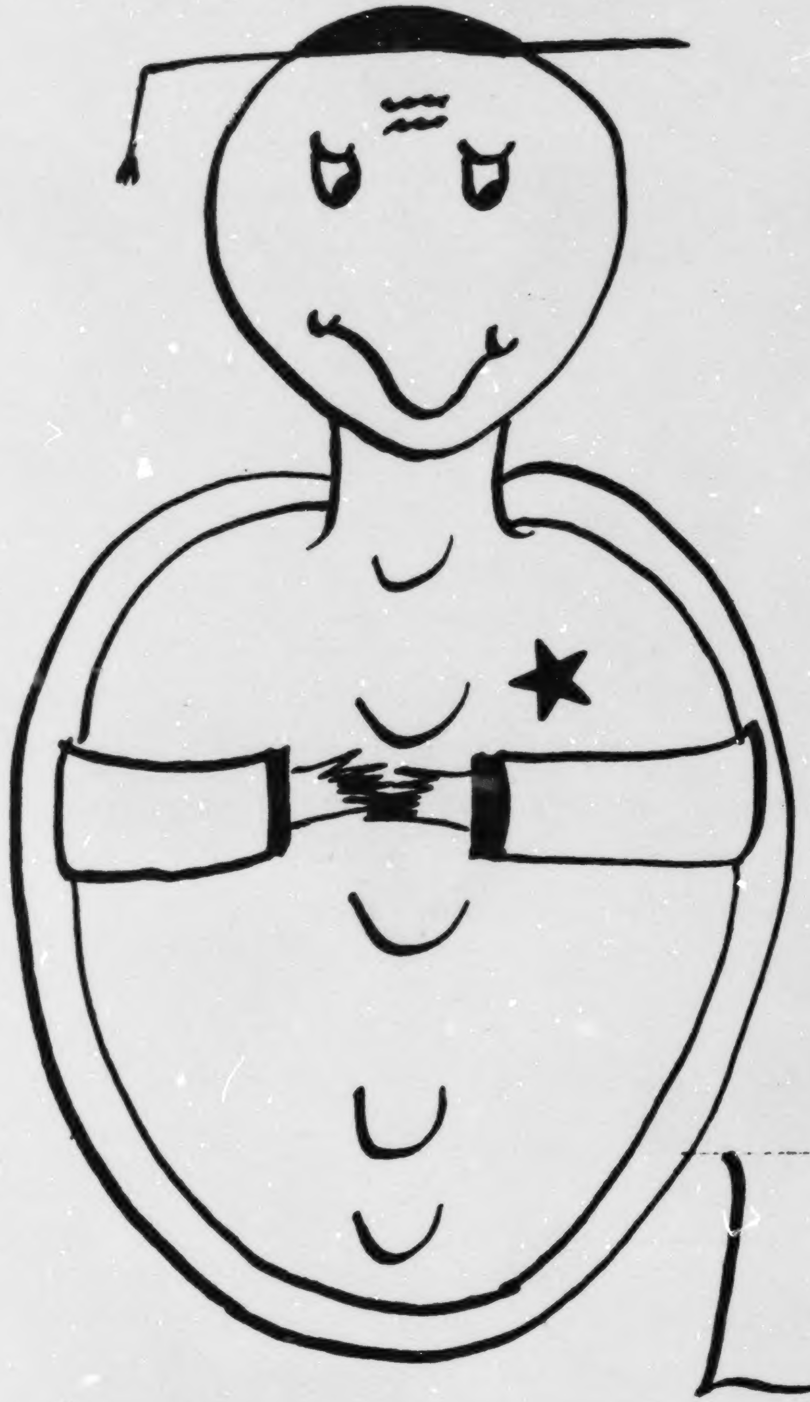
STUDENT'S NAME ________________

The student booklet is completed by the student in upper grades and by the proctor in grades K - 2. There should be 5 pages, one for each lesson.



LOG

LESSON #

date: time:

PROCTOR :

TEACHER :

SUPERVISOR:

P.O.

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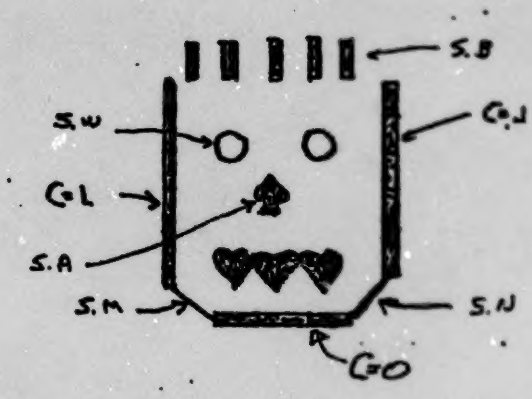
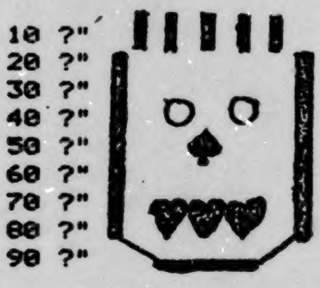
GRAPHICS ON THE PET

DRAW THE FOLLOWING FACE ON THE Right SIDE OF THE SCREEN.



PROGRAM #6

ADD THE LINE NUMBERS, ? AND " TO THE Left SIDE OF THE SCREEN



```
10 ?"
20 ?"
30 ?"
40 ?"
50 ?"
60 ?"
70 ?"
80 ?"
90 ?"
```

Create your own picture in this way.
Give your picture a unique name.

IV-4-13
Level 2
Expansion

Activities Using the "PRINT" Statement

Students could perform a number of activities using the PRINT statement. Students could write a program to have the computer . . .

- List the names of favourite foods, athletes, teams, colours, books, etc.
- List the provinces of Canada.
- Write a monologue or dialogue.
- Write a joke or poem.
- Draw a picture.
- List name, address and vital statistics.
- Write an advertisement.

If a printer is available, students should obtain a print out of their programs.

IV-4-14
Level 1
Introduction

PRINTING ACTIVITY

TO USE THE SEMI-COLON IN A PRINT STATEMENT

1. Turn on the PET or clear the screen.
2. Type the following:

   ```
   PRINT 3*4;5*8;6*2;
   ```

   and then hit RETURN.
3. Now there should be 4 answers on the same line.
4. The semi-colon is used to separate questions. It will place answers closer together on a line.
5. Now try each of the following and check to see how the answers are spaced.

   ```
   ? 7*6;7*7;7*8;7*9

   ? 8 * 3;4* 2;1+1;25*2

   ?22/10;15/3;45/9;11/3

   ? 1+6+7+8-3-2;8*2;6+11;.02+3

   ?11+5/2;25.6/.2;26.5/6;11/9
   ```

IV-4-15
Level 1
Introduction

PRINTING ACTIVITY

TO USE THE COMMA IN A PRINT STATEMENT

1. Turn on the PET or clear the screen.
2. Type the following:

   ```
   PRINT 3*4,5*8,6*2,1*8
   ```

   and then hit RETURN.
3. Now there should be 4 answers on the same line.
4. The comma is used to separate questions. It will place 4 answers on one line.
5. Now try each of the following and check to see how the answers are spaced.

   ```
   ? 7*6,7*7,7*8,7*9

   ? 8 * 3,4* 2,1+1,25*2

   ?22/10,15/3,45/9,11/3

   ? 1+6+7+8-3-2,8*2,6+11,.02+3

   ?11+5/2,25.6/.2,26.5/6,11/9
   ```

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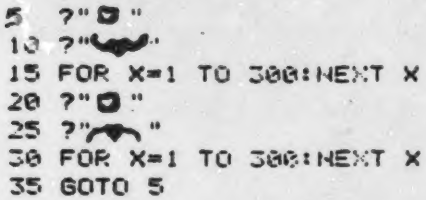
MOVING PICTURES!

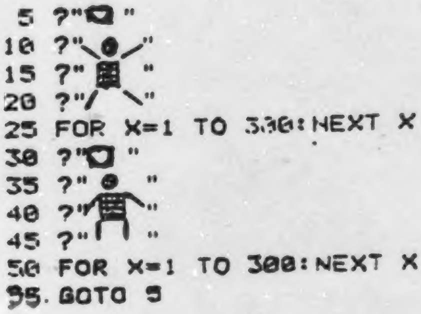
Type in the sample programs. Describe what each program does.

PROGRAM #1



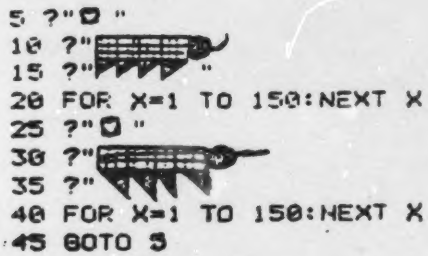
```
5  ?"■ "
10 ?"     "
15 FOR X=1 TO 300:NEXT X
20 ?"■ "
25 ?"     "
30 FOR X=1 TO 300:NEXT X
35 GOTO 5
```

PROGRAM #2



```
 5 ?"■ "
10 ?"\●/"
15 ?" ▦ "
20 ?"/  \"
25 FOR X=1 TO 300:NEXT X
30 ?"■ "
35 ?" ● "
40 ?"    "
45 ?"    "
50 FOR X=1 TO 300:NEXT X
55 GOTO 5
```

PROGRAM #3



```
5 ?"■ "
10 ?"        "
15 ?"        "
20 FOR X=1 TO 150:NEXT X
25 ?"■ "
30 ?"        "
35 ?"        "
40 FOR X=1 TO 150:NEXT X
45 GOTO 5
```

Create your own moving picture! Save it for future use.

IV-4-17
Level 2
Introduction

REPETITIONS

A. What do you think will happen?

```
 5 PRINT "HI THERE"
10 GOTO 5
15 END
```

____

____

Type in the program. What happens?

____

B. Now try this:

What do you think will happen?

```
 5 7 ⌄
10 FOR X=1 TO 10
20 ? "their name"
30 NEXT X
40 END
```

____

____

Type in the program. What happens?

Try these using a FOR, NEXT loop.

- Fill the screen with hearts.
- Print your name followed by a blank line 10 times on the screen.
- Fill the screen with your favorite number.
- Fill the screen with the name of your best friend.

IV-4-18
Level 2
Introduction

Activities Using Input Statement

From a program which writes a dialogue using only PRINT statement, introduce the INPUT statement to offer more versatility.

Example:

```
10 PRINT "HOW ARE YOU?"
20 PRINT "I AM WONDERFUL."
30 PRINT "GEE THAT'S NICE."
40 PRINT "THANKS"
```

Introduce the INPUT statement and have the student share the new program with a friend OR have two students work together.

Example:

```
10 PRINT "HOW ARE YOU?"
20 INPUT N$
30 PRINT N$
40 PRINT "GEE THAT'S NICE."
50 INPUT N$
60 PRINT N$
```

Getting Answers: The INPUT Statement

Sample Program

Type in only the lines that have a star.

```
*   20 ?  "What is your name?"    <return>
```

At this point if someone is operating the computer, information must be inputted into the machine, therefore we use an INPUT statement

```
* 30   INPUT Name$      <return>
```

Name $ represents a variable. The $ lets the computer know that the variable coming in will be words. The computer will store your name under the variable name NAME $. This type of variable is called a string variable (string meaning words).

NOTE: This variable can now be called up and used in many ways.

```
* 40 ?  NAME$"—How old are you?"              <return>
                                       "___" is a space, press space bar
```

```
* 50 INPUT AGE                 <return>
```

This time the variable does not have the $ because the variable is only a number, not text.

```
* 60 ?  NAME $  "__ you are __ "AGE" __ years old"
```

Type RUN and press <return> . Call up your program by typing LIST and press <return>

Information Check

You should now be able to set up a dialogue with someone using their responses by calling up the appropriate variables.

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SOUND ROUTINES

FLAPPING WINGS

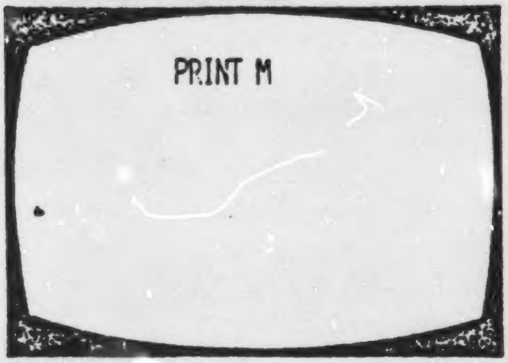
	NOTES
`10 POKE 36878, 15`	Turns on sound
`20 POKE 36876, 130`	Low sound
`30 POKE 36876, 135`	Higher sound

DIVING SOUND

`10 POKE 36878, 15`	Turns on sound
`20 POKE 36876, 230-0`	Sound
`30 POKE 36878, 0`	Turns off Sound

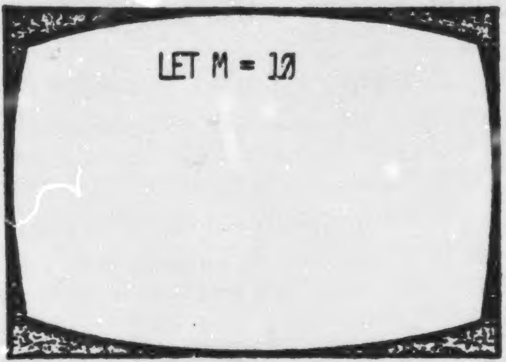
Try these SOUND routines.

Use them in a program which will generate 5 seconds of each sound.



```
PRINT M
```

```
PRINT "M"
```

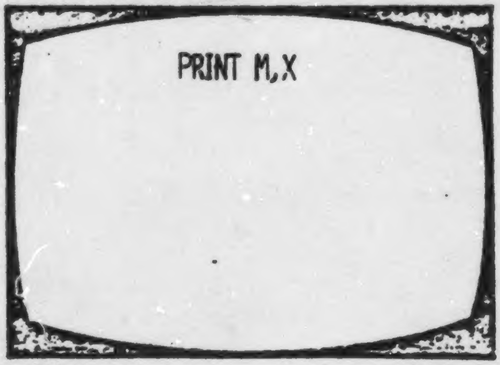


```
LET M = 10
```

```
LET X = 5
```

TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.

```
PRINT M
```



```
PRINT M,X
```

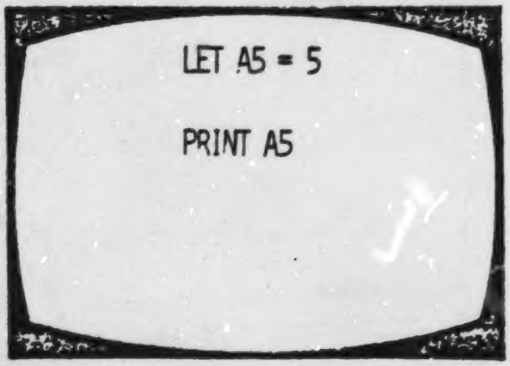
```
PRINT M; X
```

```
PRINT M + M
```

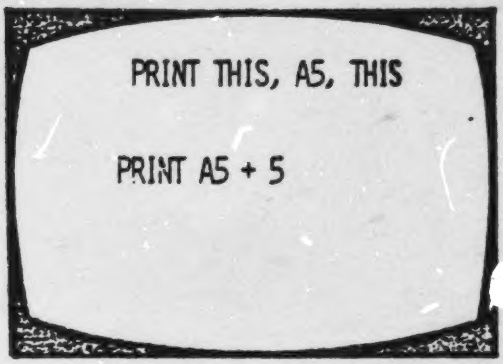
INTRODUCING VARIABLES, PAGE 2

STUDENT WORKSHEET

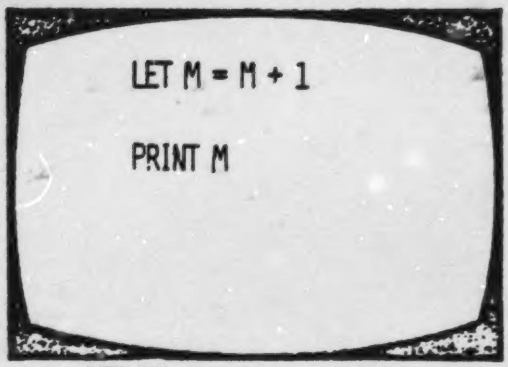
```
LET THIS = 157

PRINT THIS
```



```
LET A5 = 5

PRINT A5
```

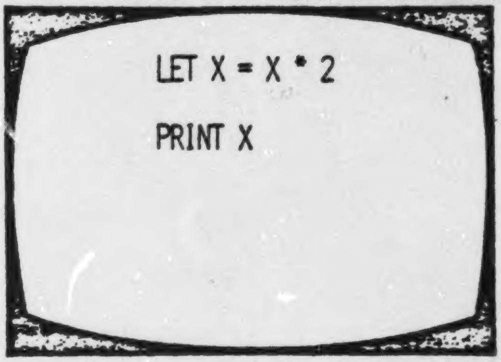


```
PRINT THIS, A5, THIS

PRINT A5 + 5
```

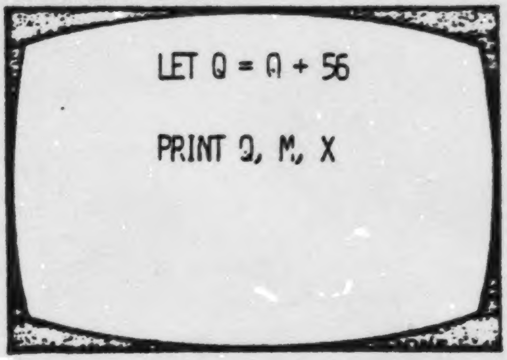


```
LET M = M + 1

PRINT M
```

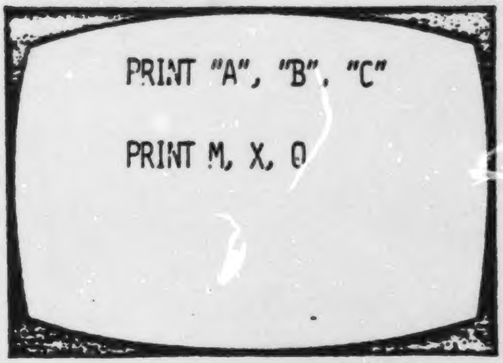
TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.



```
LET X = X * 2

PRINT X
```



```
LET Q = Q + 56

PRINT Q, M, X
```



```
PRINT "A", "B". "C"

PRINT M, X, Q
```

```
PRINT "BOYS, "GIRLS"

PRINT X, Q
```

```
PRINT M
0
```

```
PRINT "M"
M
```

```
LET M = 10
```

(nothing on screen)

```
LET X = 5
```

TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.

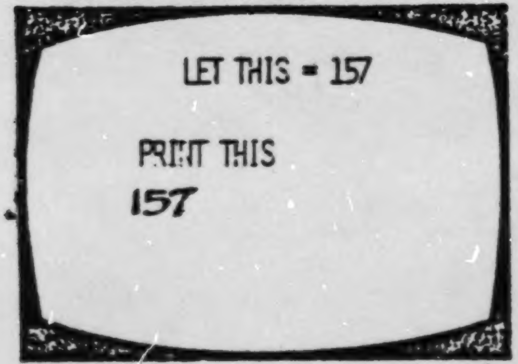
157

```
PRINT M
10
```

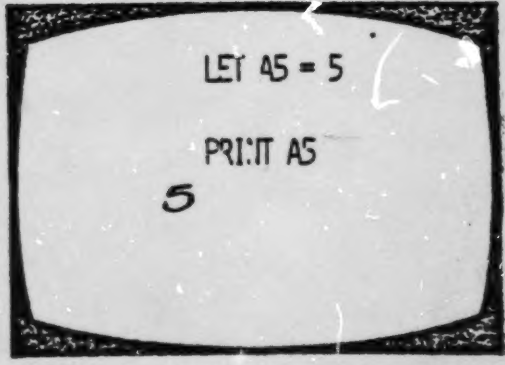
```
PRINT M, X
10    5
```

```
PRINT M ; X
105
```

```
PRINT M + M
20
```

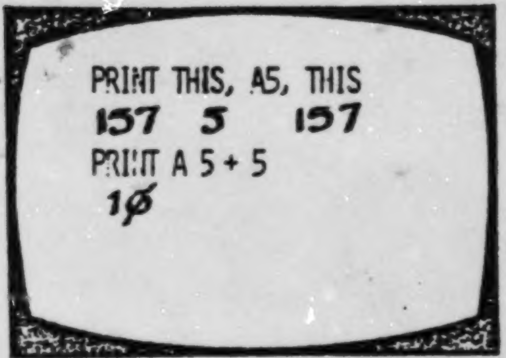


```
LET THIS = 157

PRINT THIS
157
```

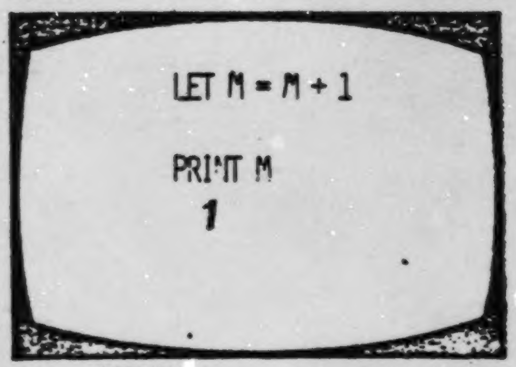


```
LET A5 = 5

PRINT A5
5
```

format may differ on your computer →

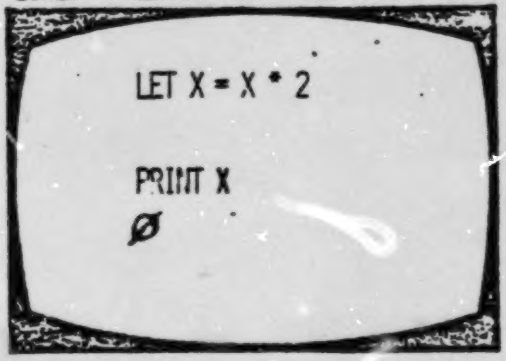


```
PRINT THIS, A5, THIS
157  5  157
PRINT A 5 + 5
10
```

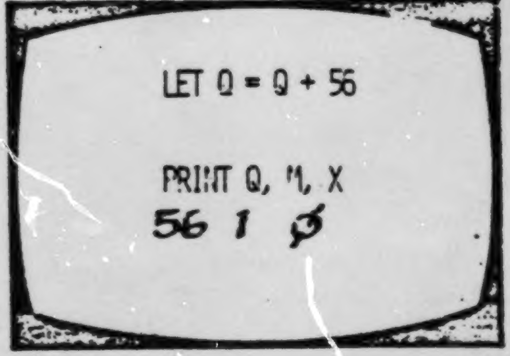


```
LET M = M + 1

PRINT M
1
```

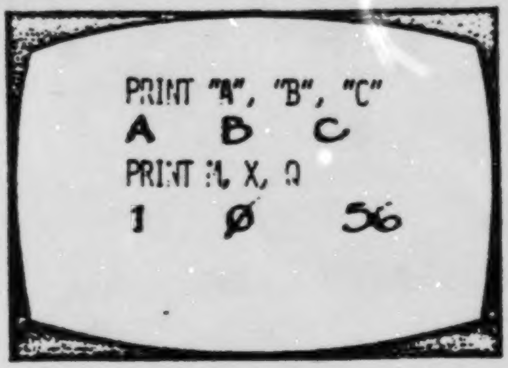
TYPE EACH LINE ONTO THE COMPUTER. PRESS THE RETURN KEY AT THE END OF EACH LINE. PREDICT WHAT WILL HAPPEN BEFORE YOU PRESS RETURN.



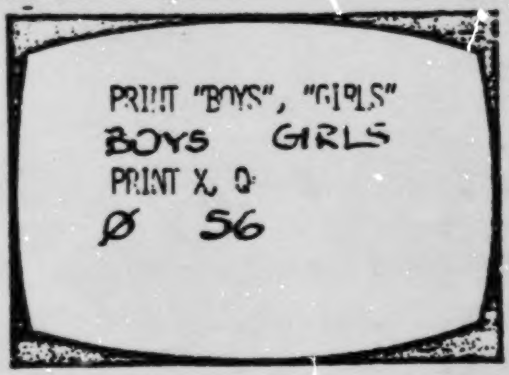
```
LET X = X * 2

PRINT X
0
```



```
LET Q = Q + 56

PRINT Q, M, X
56 1 0
```

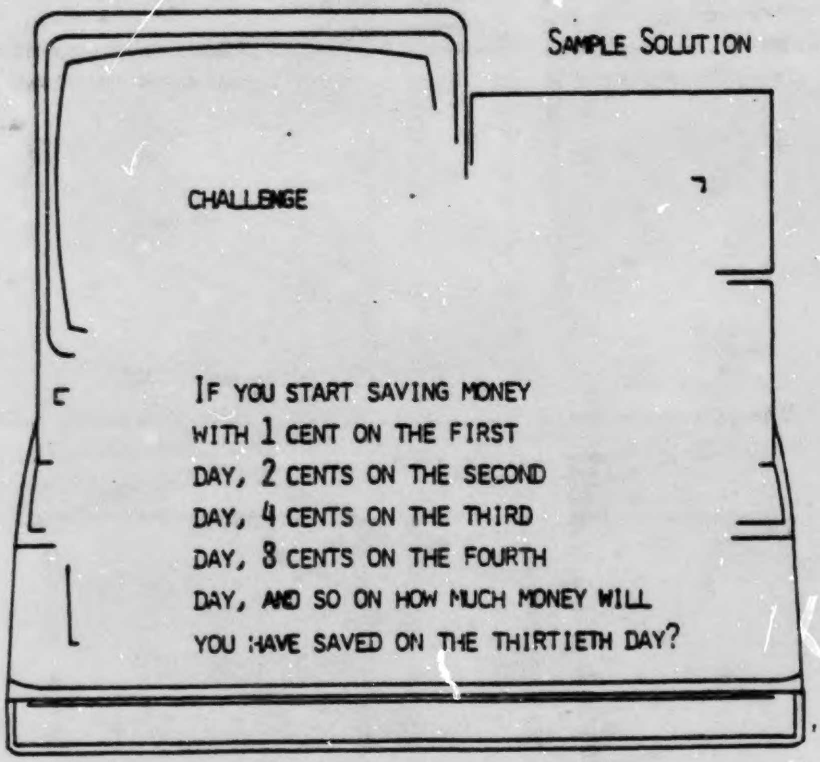


```
PRINT "A", "B", "C"
A   B   C
PRINT M, X, Q
1   0   56
```



```
PRINT "BOYS", "GIRLS"
BOYS   GIRLS
PRINT X, Q
0   56
```

SAMPLE SOLUTION



CHALLENGE

IF YOU START SAVING MONEY
WITH 1 CENT ON THE FIRST
DAY, 2 CENTS ON THE SECOND
DAY, 4 CENTS ON THE THIRD
DAY, 8 CENTS ON THE FOURTH
DAY, AND SO ON HOW MUCH MONEY WILL
YOU HAVE SAVED ON THE THIRTIETH DAY?

A. UNDERSTAND THE PROBLEM

1. CONDUCT AN EXPERIMENT: USE COUNTERS OR COINS TO SIMULATE THE DOUBLING OF MONEY EACH DAY AS DESCRIBED IN THE PROBLEM.

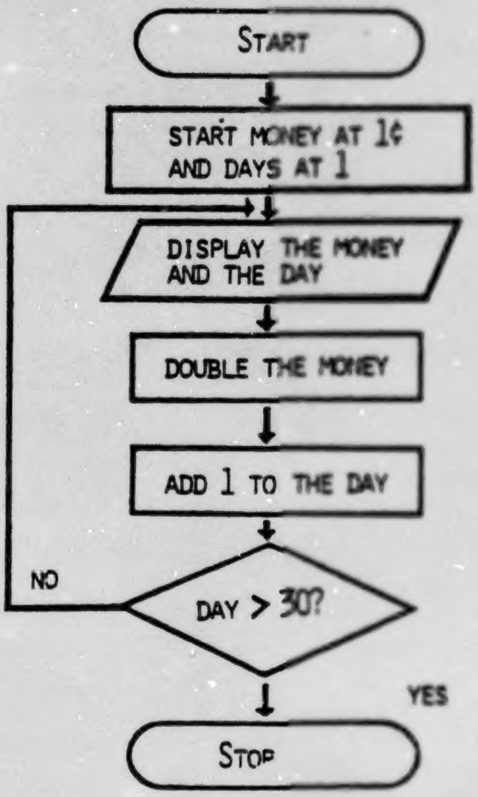
2. MAKE A TABLE: COMPLETE THE TABLE AS THE EXPERIMENT IS BEING CONDUCTED.

DAY	MONEY
1	1
2	2
3	4
4	8
5	16
.	.
.	.
.	.

3. USE A CALCULATOR: CONTINUE THE TABLE TO 30 DAYS.

SAMPLE SOLUTION

B. MAKE A PLAN


START
START MONEY AT 1¢ AND DAYS AT 1
DISPLAY THE MONEY AND THE DAY
DOUBLE THE MONEY
ADD 1 TO THE DAY
NO
DAY > 30?
YES
STOP

```
10 LET M = 1
20 LET D = 1
30 PRINT M,D
40 LET M = M * 2
50 LET D = D + 1
60 IF D>30 THEN END
70 GOTO 30
```

C. CARRY OUT THE PLAN
TRY IT ON THE COMPUTER

SAMPLE SOLUTION PAGE 2

D. LOOKING BACK

ADD TITLES TO THE TWO COLUMNS SUCH AS "DAYS" AND "MONEY".

CHANGE THE TOTAL TO DOLLARS AND CENTS BY DIVIDING BY 100 OR MULTIPLYING BY 0.01

FIND THE TOTAL AMOUNT OF MONEY SAVED IN 30 DAYS.

```
3    REM   THE WORM
5    ? " ▼
10   ? TAB (8) " THE WORM
12   REM  SOIL
15   ? " ▣▣▣▣▣▣▣▣
20   ? " ▩▩▩▩▩▩▩▩▩▩▩▩▩▩▩▩▩
25   ? "
30   ? "            LINES  25 - 48
35   ? "          SAME  AS  LINE  20
40   ? "
45  ?  "
48  ? "
50  ? " [S]
55  ? " ▣▣▣▣▣▣▣▣▣▣▣▣
60  FOR T = 0 to 17
65  ? TAB  (T) "  ▬▬▬╯
70  GOSUB 200
75  ? TAB  (T) "  ◘◘
80  ? TAB  (T) "bbbb"
85  ? TAB  (T) "  ◘◘
90  ? TAB  (T) "  ▬▬▬▬‾
92  GOSUB 200
95  ? TAB  (T) "  ◘◘
100 ? TAB  (T) "bbbb"
105 ? TAB  (T) "  ◘◘
110 NEXT T
115 GOTO 5
200   REM DELAY
205   FOR Z = 1 to 90 :  Next Z
210   RETURN
```

NOTES

8 ▣'s CURSOR ⇓

17 ▩'s
↖ G +

[S] Cursor home

12 ▣'s CURSOR ⇓

▬▬▬╯ ↖ SHIFT
↑ G I

b BLANK

◘ CURSOR ⇑

▬▬▬▬‾ ↖ SHIFT F
4 G P

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(Courtesy John Berestiansky, Fort Garry School Division)

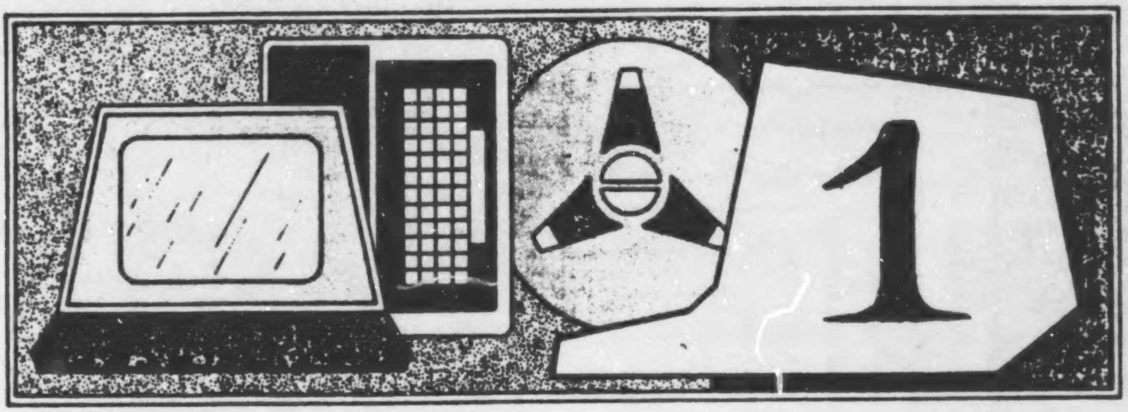
GETTING TO KNOW OUR APPLE MICROCOMPUTER

STUDENT ______________________

PROCTOR ______________________

PREPARED BY

KAREN YAMADA
OCTOBER 1982



1. "BOOTING UP"

CHECKLIST

Step 1.: Place the diskette carefully into the disk drive. Use the COMPUTER AWARENESS diskette. ________

Step 2.: Turn on the computer. ________

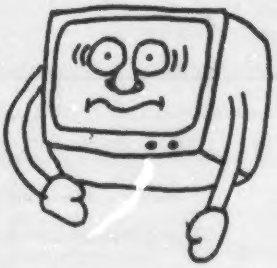
Step 3.: Turn on the T.V. ________

Step 4.: Wait until after the RED disk drive light is out. ________

2. GETTING TO KNOW THE "APPLE"

We will be getting to know this microcomputer. In order to become aquainted with it we must be able to speak in a language it understands. This microcomputer understands a language called ____________.We will have to learn some special statements and commands in order to communicate with this computer.

3. The PRINT Statement



Try these:

PRINT "HELLO"

____

PRINT "____________"

____

PRINT "____ ____________"

____

PRINT "____"

____

THE PRINT STATEMENT TELLS THE COMPUTER TO PRING THE INFORMATION THAT IS BETWEEN QUOTATION MARKS.

Type:

THE NEW COMMAND CLEARS THE COMPUTER'S MEMORY SO THAT IT IS READY FOR YOUR COMMANDS.

Try this:

```
    10 PRINT "HELLO"
    20 PRINT "_________________"
    30 PRINT "____________________________________________________________"
    40 PRINT "____________________________________________________________"
             ____________________________________________________________
```

THE NUMBERS ARE LINE NUMBERS AND THEY TELL THE COMPUTER TO REMEMBER WHAT WE HAVE TYPED. WHEN WE USE LINE NUMBERS WE HAVE WRITTEN A BASIC PROGRAM.

THE LIST COMMAND TELLS THE COMPUTER TO LIST ALL THE PROGRAM LINES.

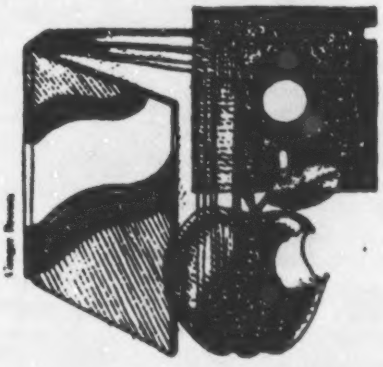
Type:

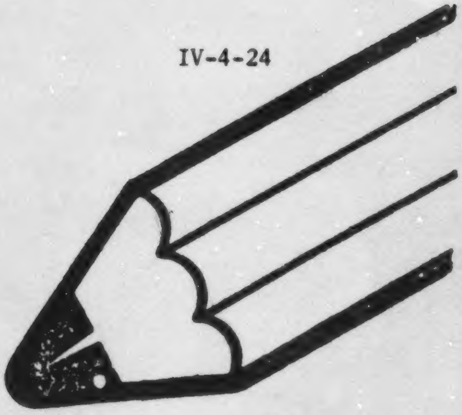
```
    LIST
```

WE HAVE TO TYPE A SPECIAL COMMAND WHICH TELLS THE COMPUTER TO GO AHEAD AND PROCESS THOSE LINES THAT WE TYPED.

Type:

```
    RUN

_______________________

_______________________

________________________________________________________________________

________________________________________________________________________
```





ASSIGNMENT

Write a program using PRINT statements.
Have this program ready to type in next time.

1. "BOOTING UP"

CHECKLIST:

STEP 1 ________
STEP 2 ________
STEP 3 ________

2. Type:
NEW

Type in your assignment.

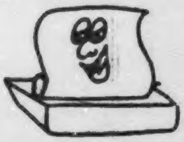
Type:
RUN

DEBUG your program. Correct any errors.

This program is in working order.

Proctor's signature __________________

3. GETTING A PRINT-OUT

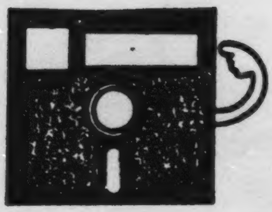


Your proctor will turn on the printer and print a listing of your program.

Tape it in HERE:

1. "BOOTING UP"

BOOT UP THE SYSTEM MASTER DISKETTE TODAY.



Step 1. ____
Step 2. ____
Step 3. ____

2. COLOR ON THE COMPUTER !

RUN *the* COLOR DEMOSOFT *program for a demonstration of the* T.V. *colors.* LIST *the colors available on the* Apple Microcomputer.

____ BLACK

____ MAGENTA

____ DARK BLUE

____ PURPLE

____ DARK GREEN

____ GREY

____ MEDIUM BLUE

____ LIGHT BLUE

____ BROWN

____ ORANGE

____ GREY

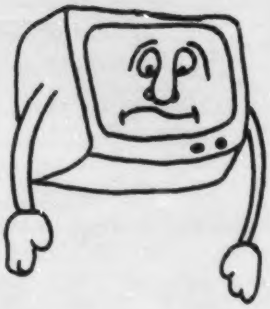
____ PINK

____ GREEN

____ YELLOW

____ AQUA

____ WHITE



3. GRAPHICS

Type:

```
NEW
GR
```

THE GR COMMAND TELLS THE COMPUTER TO SWITCH TO THE GRAPHICS MODE.

Choose a color:

```
COLOR = ____
PLOT 0,0
```

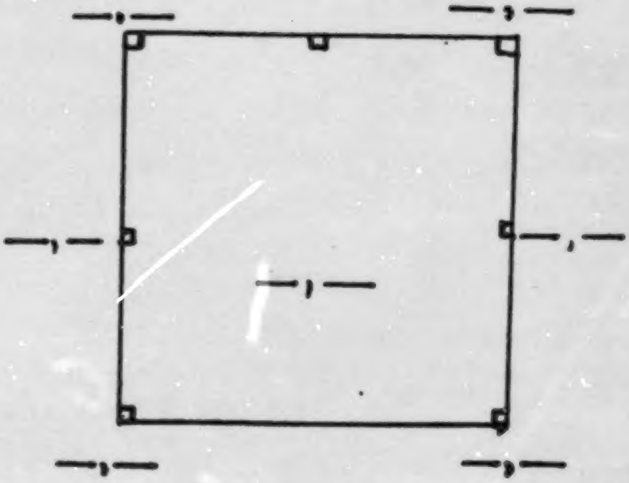
Find the square on the diagram and label it.

Try these:

```
PLOT  0,39
PLOT 39,0
PLOT 39,39
PLOT  0,20
PLOT 39,20
PLOT ____,____
```

Try to place a square in the middle of the screen.

```
PLOT ____,____
```



ASSIGNMENT

DRAW A GRAPHIC (PICTURE) ON THE NEXT PAGE.

USE ONLY THREE COLORS. AVOID USING BLACK.

HAVE YOUR GRAPHIC READY BY NEXT CLASS.

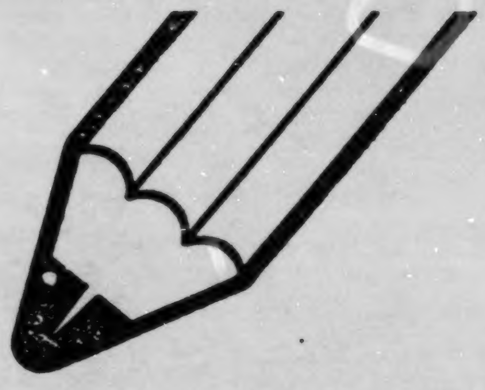
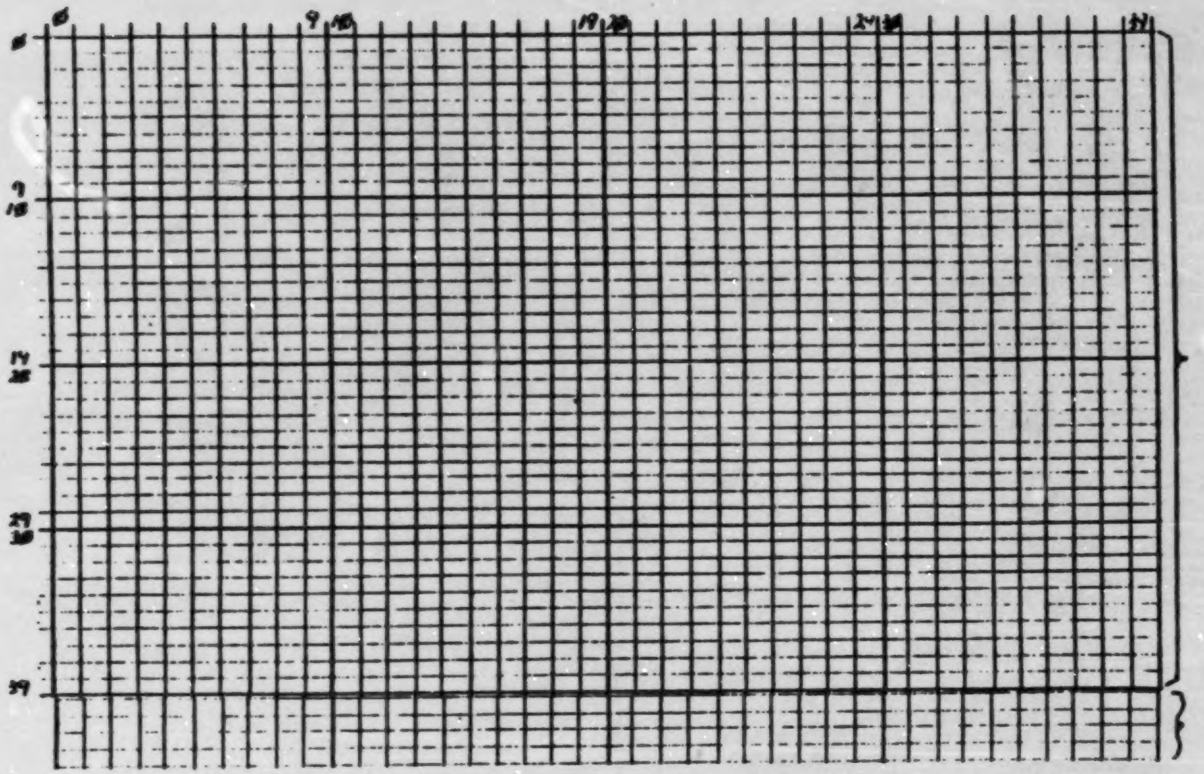


Diagram of Output Screen For Applesoft Low-Resolution Graphics



this area used
for graphics

this area used
for text

DRAWING LINES

1. "Booting Up"

Step 1. ________

Step 2. ________

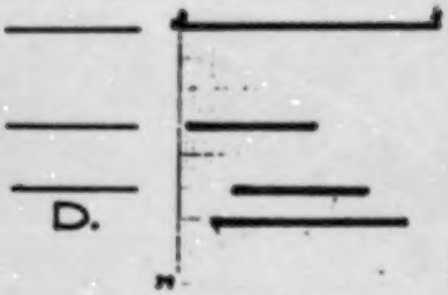
Step 3. ________

2. Horizontal lines are lines which go ____________________.

3. Label these on the picture.

Type:

```
GR
COLOR = ____
A. HLIN 0,39 AT 0
B. HLIN 1,20 AT 15
C. HLIN 8,28 AT 25
D. HLIN ___,___ AT ___
```



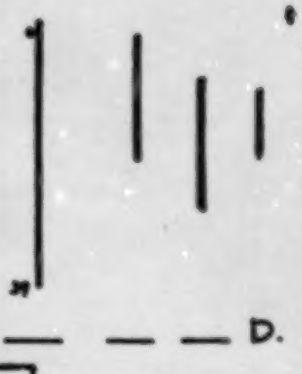
4. Vertical lines are lines which go ____________________.

5. Label these on the picture.

Type:

```
HOME
A. VLIN 0,39 AT 0
B. VLIN 1,20 AT 15
C. VLIN 8,28 AT 25
D. VLIN ___.___ AT ___
```

The HOME command clears the screen.



PROGRAMMING YOUR GRAPHIC

USE HIS PAPER TO WRITE A PROGRAM TO DRAW YOUR GRAPHIC. HAVE YOUR PROGRAM READY BY NEXT CLASS.

175

IV-4-24

1. "Booting Up"
   Step 1 ____
   Step 2 ____
   Step 3 ____

2. Type in your program.
3. DEBUG

This program is in working order.

Proctor's signature ______________

4. SAVE your program on the diskette.
   Check the CATALOG to see if your program is there.
5. PRINT a LISTING of your program.
   Attach it the the next page.

A COMPUTER PLAY IN 3 "BYTES"

by Evelyn Podolsky

ACT 1

Setting: Classroom - Students in desks

Teacher: I have a big surprise for you boys and girls.

Children: Act excited

Teacher: Settle down and listen closely. Our school has just purchased 3 microcomputers. They will be here next week.

Children: Look puzzled.

Teacher: Well boys and girls, you don't seem very excited."

~~Mary:~~ Linda We were hoping our surprise was a day off.

David: Computers mean nothing to us!

Teacher: Let's see if David is right. Who knows anything about computers?

Sally: They're scarey!

Peter: Huge companies buy computers - not schools.

Joey:. Computers will change my life.

Teacher: Excited! How is that Joey.

Joey: I heard Miss Wilson, my Social Studies teacher say: When computers come into this school, I move out.

Children: All Cheer

Teacher: Restores order

Has anyone here heard of computers being used in schools before.

Linda: My brother's in university and he's taking a course called computer science.

Teacher: That's interesting Linda, has he told you about anything he does?"

Linda: No - not my brother.

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Teacher: Your assignment for tomorrow is to go home and ask your family what they know about computers and we'll discuss this somemore tomorrow.

Now, all get ready to go home.

ACT 2

Setting: A family sitting around the dinner table.

Peter: Dad, do you know anything about computers?

Dad: Like what Peter?

Peter: What are they used for?

Dad: Oh, big companies do all their bookkeeping on them. Why do you ask?

Peter: Mrs. Smith told us that we'll be getting computers into our school.

Dad: That's crazy - more wasting of tax payers money. What are they going to do with them?

Mom: Maybe it's not such a bad thing George. The other day when I went to the bank, the teller gave me a different kind of bank book. She said all their banking is done with computers now. Then, I went to the new grocery store that opened up, and the check out girl did nothing. She told me the computer was reading and recording the prices. Look at this sales slip.

Little Paul: Yea, and I want a computer game for Christmas. "Space Invaders" that's my favorite.

BEEP! BEEP! BEEP!

Mom: That's the microwave. The soup is ready.

Mom leaves.

Peter: Dad isn't our microwave oven just like a computer.

Dad: That's true. I never thought of that before.

Mom returns and sits down.

Dad: You know Alice - maybe it's a good idea that Peter will be exposed to computers. They seem to be creeping up all around us. Just imagine what the world will be like when Peter's our age.

ACT 3

Setting: Back in school.

Teacher: well boys and girls, who did their homework.

All hands go up.

Teacher: Well then, who would like to give us a report on what they learned about computers?

Peter: Stands up

At first my Dad was against computers coming into the school. But when we discussed it, we found out computers are all around us. For example, in the banks, grocery stores, even T.V. games have computers in them.

Teacher: Very good point. Anyone else.

INPUT FROM COMPUTER [illegible]

Teacher: Well boys and girls I see you all did a good job of your homework. Let's start spreading the good news around the school. And Joey, your job will be to convince Miss Wilson to stay here and learn about computers with us.

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COMPUTERS AND STUDENTS, CONSUMERS, WORKERS, CITIZENS

(Courtesy Alberta Department of Education)

1. Discuss the meaning of each of these roles: student; consumer; worker; citizen. Arrange the "transparent people" on an overhead projector in these four groups as discussion proceeds.

2. Give each student a "COMPUTER USES" worksheet to complete. Provide them with the extra sheet of "blank people" to add to their display of other computer uses.

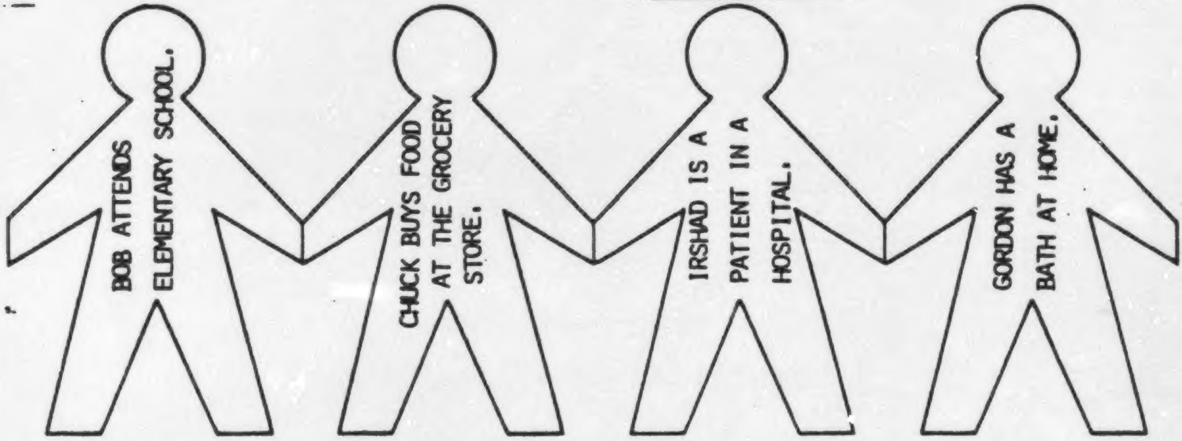
3. Make at least one prediction for each role.
e.g. student: Learning will be an ongoing life process by using home computers to access information from many places.
consumer: Money will be replaced by plastic cards.
worker: People will work at several jobs in the course of their careers. Retraining will be necessary.
citizen: Instant polling via home computers will involve citizens in more decision-making.

4. Discuss.
- What are the advantages and disadvantages of each prediction?
- How should we adjust to each of these changes?

5. Computer "mistakes" should arise during this discussion. Emphasize that computers do not make mistakes (although they can fail mechanically). Discuss and list some human errors that are often labelled as computer mistakes (e.g., incorrect entries, programming errors, sabotage....).

STUDENT? CONSUMER? WORKER? CITIZEN? OVERHEAD TRANSPARENCIES

(Cut apart transparency film; rearrange in four groups on overhead projector.)

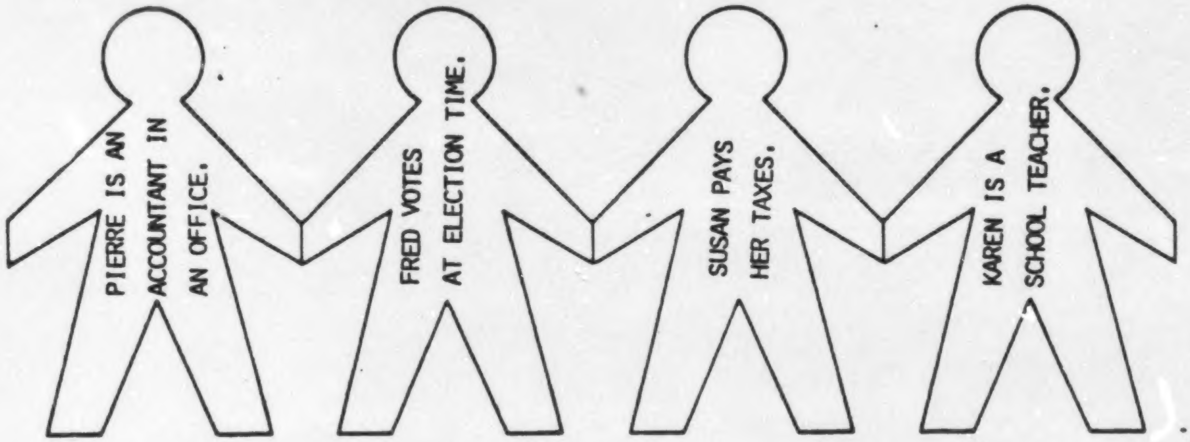


BOB ATTENDS ELEMENTARY SCHOOL.

CHUCK BUYS FOOD AT THE GROCERY STORE.

IRSHAD IS A PATIENT IN A HOSPITAL.

GORDON HAS A BATH AT HOME.

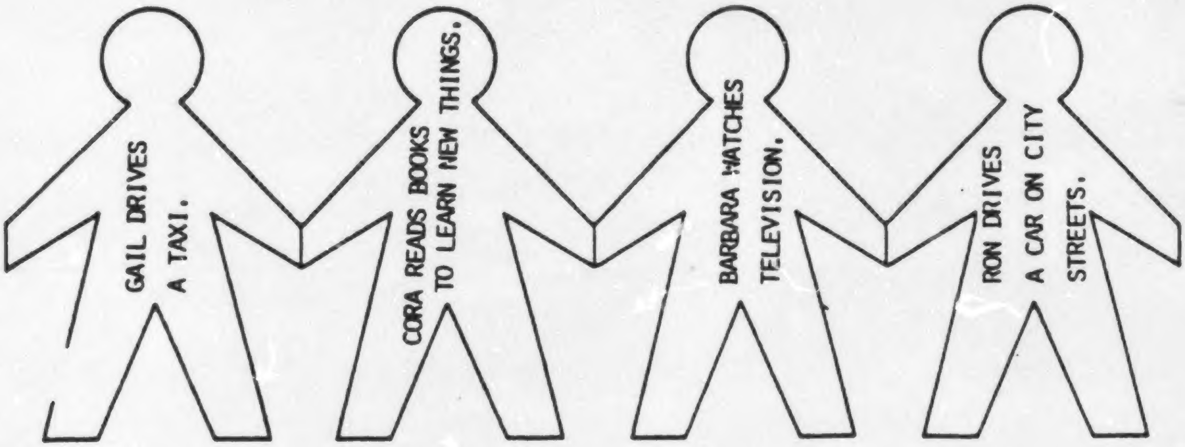


PIERRE IS AN ACCOUNTANT IN AN OFFICE.

FRED VOTES AT ELECTION TIME.

SUSAN PAYS HER TAXES.

KAREN IS A SCHOOL TEACHER.



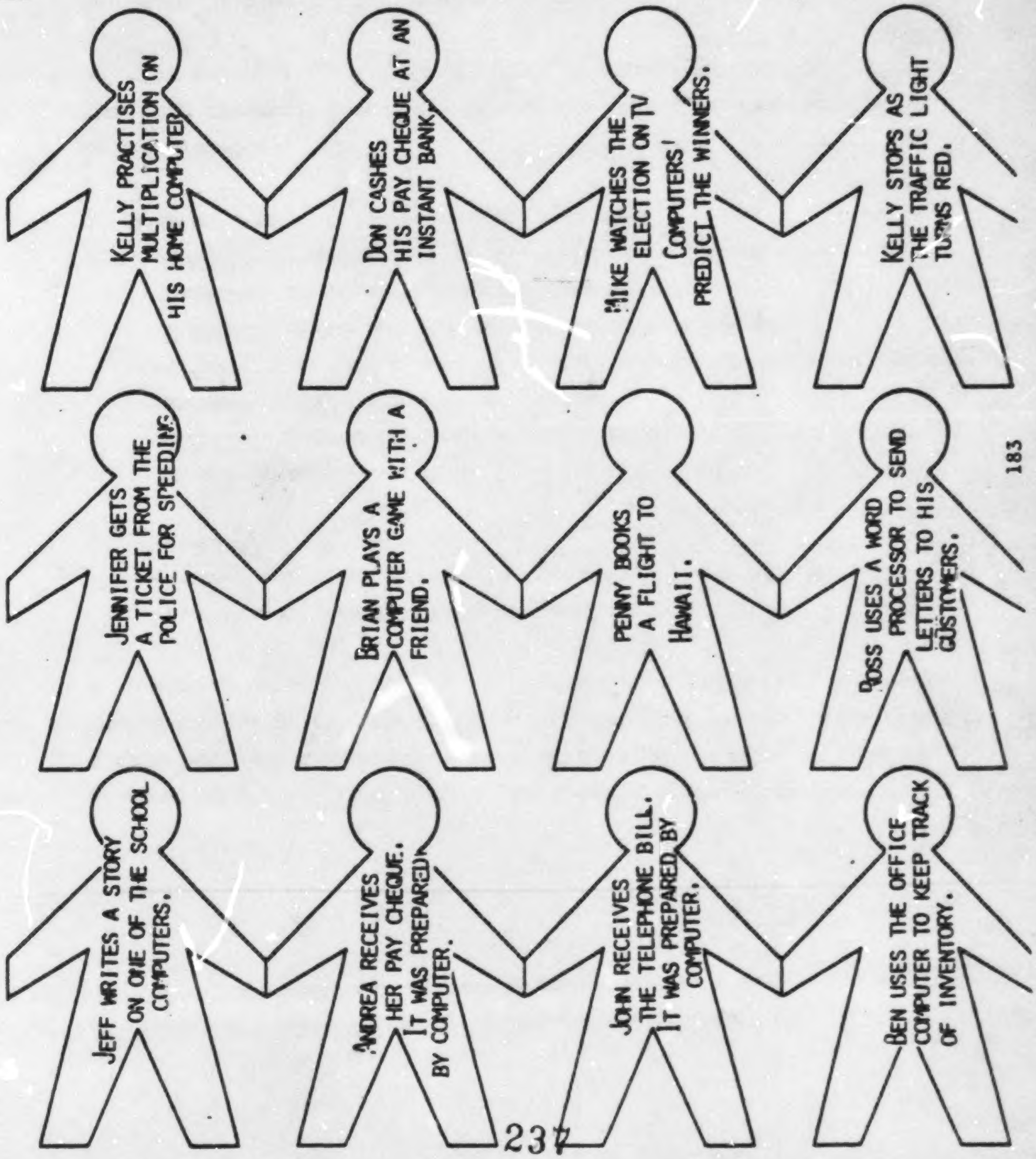
GAIL DRIVES A TAXI.

CORA READS BOOKS TO LEARN NEW THINGS.

BARBARA WATCHES TELEVISION.

RON DRIVES A CAR ON CITY STREETS.

CUT OUT THE PEOPLE ON THIS SHEET OF PAPER. PASTE THEM ON PAPER IN FOUR GROUPS: STUDENTS; CONSUMER; WORKERS; CITIZENS.



KELLY PRACTISES MULTIPLICATION ON HIS HOME COMPUTER.

DON CASHES HIS PAY CHEQUE AT AN INSTANT BANK.

MIKE WATCHES THE ELECTION ON TV COMPUTERS' PREDICT THE WINNERS.

KELLY STOPS AS THE TRAFFIC LIGHT TURNS RED.

JENNIFER GETS A TICKET FROM THE POLICE FOR SPEEDING.

BRIAN PLAYS A COMPUTER GAME WITH A FRIEND.

PENNY BOOKS A FLIGHT TO HAWAII.

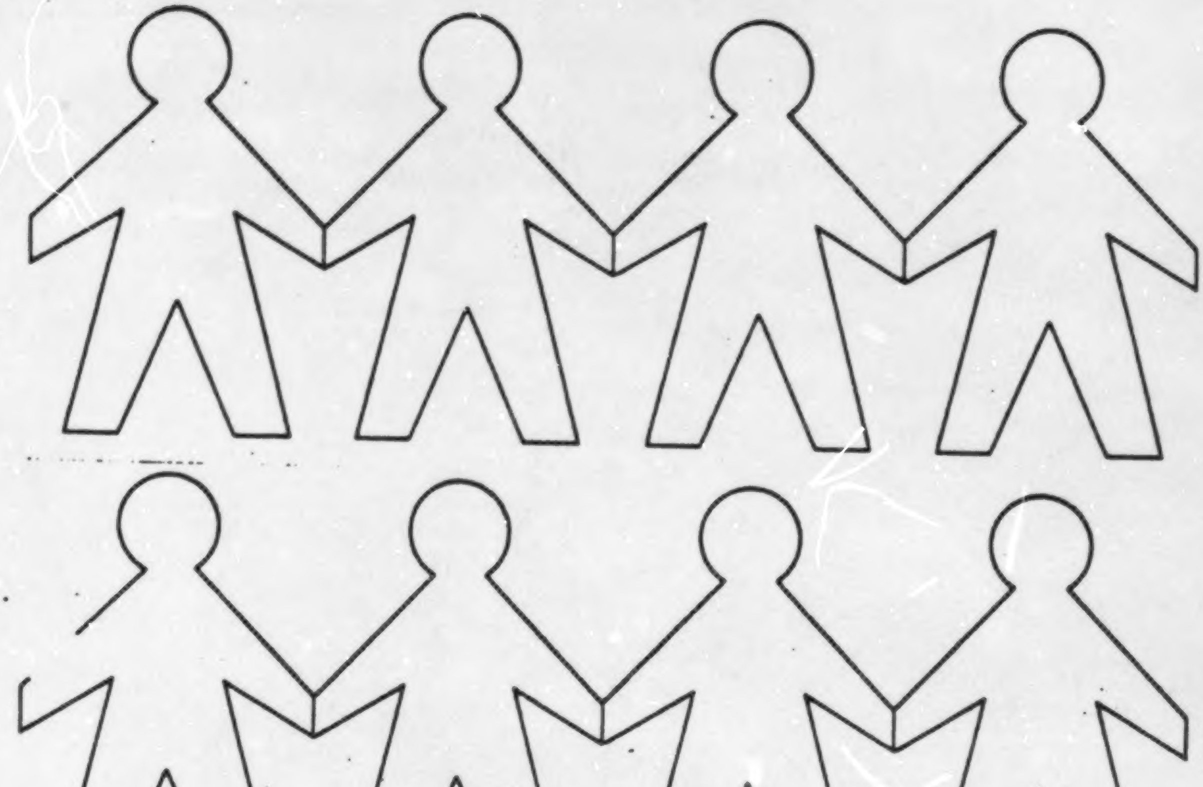
ROSS USES A WORD PROCESSOR TO SEND LETTERS TO HIS CUSTOMERS.

JEFF WRITES A STORY ON ONE OF THE SCHOOL COMPUTERS.

ANDREA RECEIVES HER PAY CHEQUE. IT WAS PREPARED BY COMPUTER.

JOHN RECEIVES THE TELEPHONE BILL. IT WAS PREPARED BY COMPUTER.

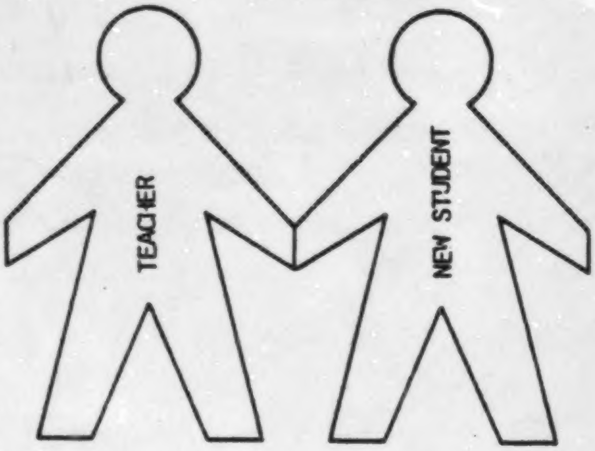
BEN USES THE OFFICE COMPUTER TO KEEP TRACK OF INVENTORY.

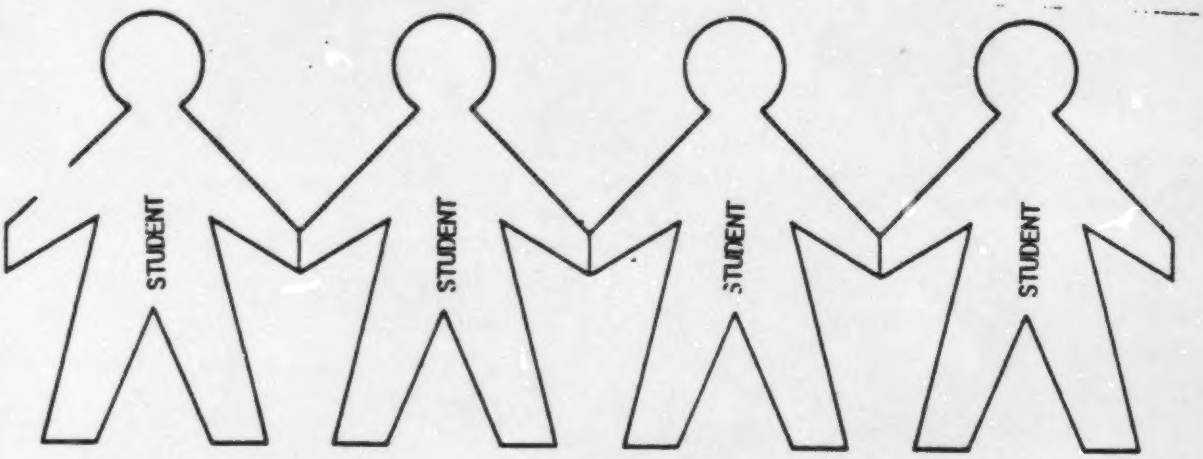


ROLE-PLAYING CARDS

SITUATION

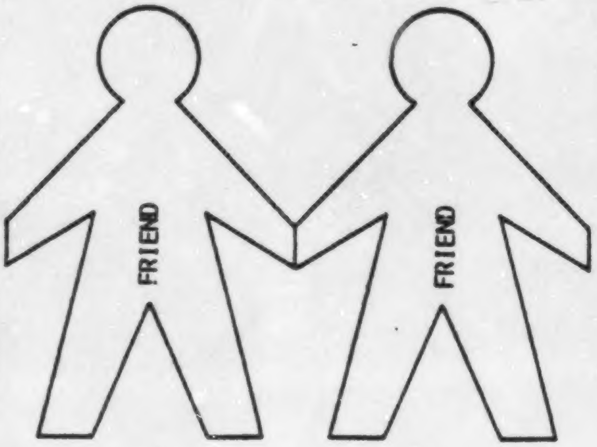
A STUDENT HAS JUST MOVED TO A SCHOOL WITH COMPUTERS. THE STUDENTS ALREADY THERE KNOW HOW TO OPERATE THEM. BUT, THE NEW STUDENT DOES NOT.





SITUATION

YOUR BEST FRIEND HAS BECOME VERY INTERESTED IN COMPUTERS. THIS FRIEND STARTS TO USE A LOT OF COMPUTER WORDS THAT YOU DO NOT UNDERSTAND.



V-1(b)-2
(E,P)

Pre-Post Test

Name:______________________________

A.. For each answer, circle T if you think the answer is TRUE, F if you think the answer is FALSE, and the ? if you are unsure.

1. Except for scientists, computers are not used very much yet.. T F ?

2. Computers are getting larger and larger every day........... T F ?

3. If there is a mistake on your telephone bill, is was probably made by people. .... T F ?

4. Police use computers to help in the identification of stolen cars and trucks; .... T F ?

5. People often use computers to store large amounts of information they wish to use over and over again. .... T F ?

6. People in the government use computers to store large amounts of information about everybody in the country. .... T F ?

7. Computers help people make decisions by answering any question that they may have. .... T F ?

8. The increaded use of computers in our society both reduces and creates jobs for people. .... T F ?

9. Computers help to keep people's bank statements in order so that the customer and bank have accurate records. ....T F ?

10. Almost everybody in our society are affected in some way by computers. .... T F ?

B. Choose one of the following places and make a list of the uses that computers have in that place: School; Airport; Bank; Hospital; Library; Television Station; Newspaper Company; Advertising Agency; Farm; Home.

Location____________________

Uses____

C. List two ways in which computers would affect you in each of these roles.

Student:____________________________________

Consumer:__________________________________

Worker:____________________________________

Citizen;___________________________________

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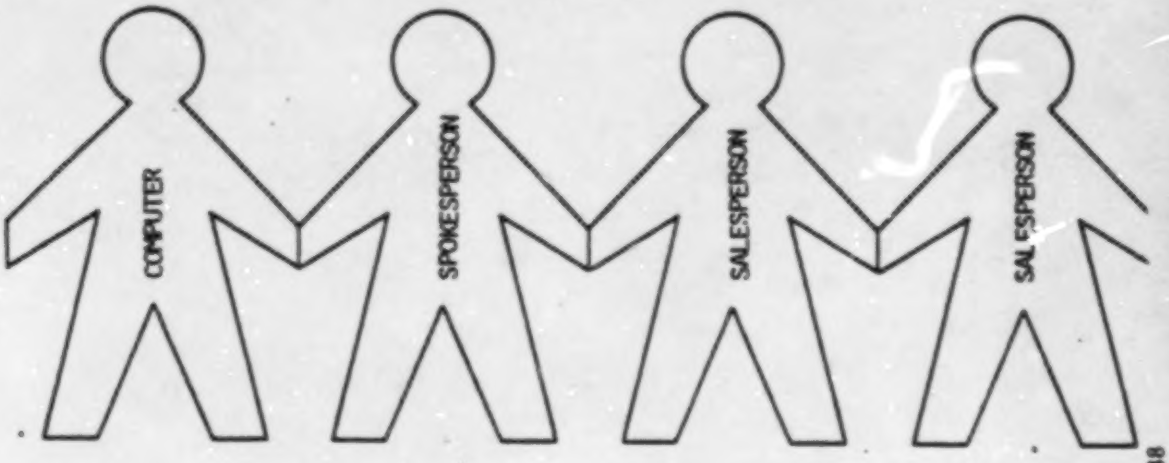
ROLE-PLAYING CARDS FOR SELLING A PRODUCT

(Courtesy Alberta Department of Education)

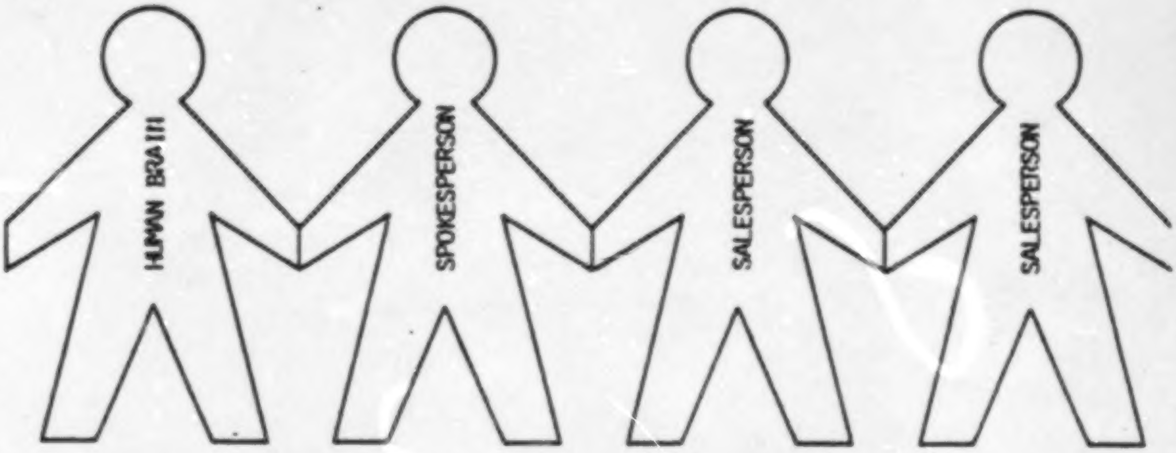
SITUATION

YOU MUST CONVINCE AN AUDIENCE OF PROSPECTIVE BUYERS THAT A COMPUTER IS WHAT THEY ARE LOOKING FOR. EACH SALE EARNS EACH COMPANY MEMBER LUNCH AT THEIR FAVOURITE RESTAURANT. BE VERY CONVINCING SINCE THE COMPETITION IS STIFF!!!!



SITUATION

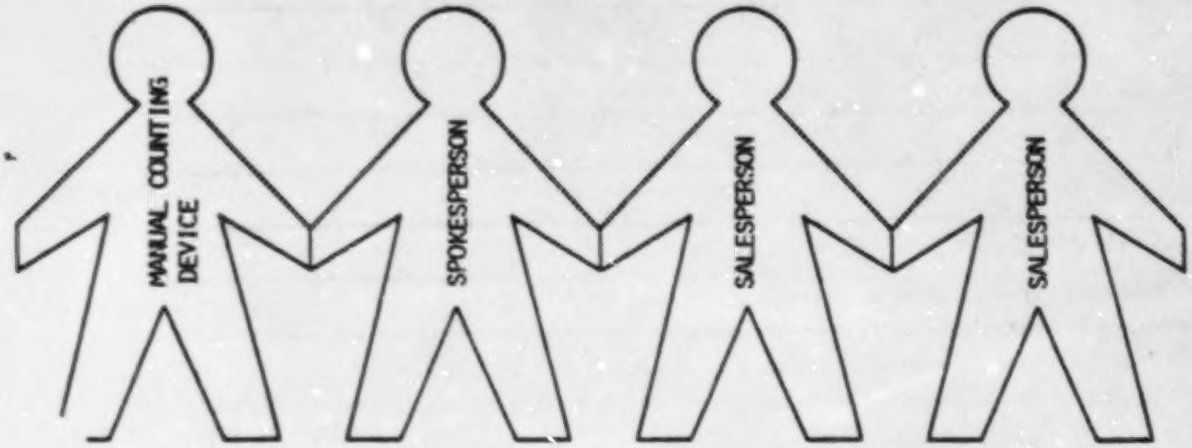
YOU MUST CONVINCE AN AUDIENCE OF PROSPECTIVE BUYERS THAT A HUMAN BRAIN IS THE BEST BUY ON THE MARKET. BE VERY CONVINCING SINCE EACH COMPANY MEMBER WILL GET A SURPRISE BONUS FOR EACH PRODUCT SOLD!!!!



ROLE-PLAYING CARDS

SITUATION

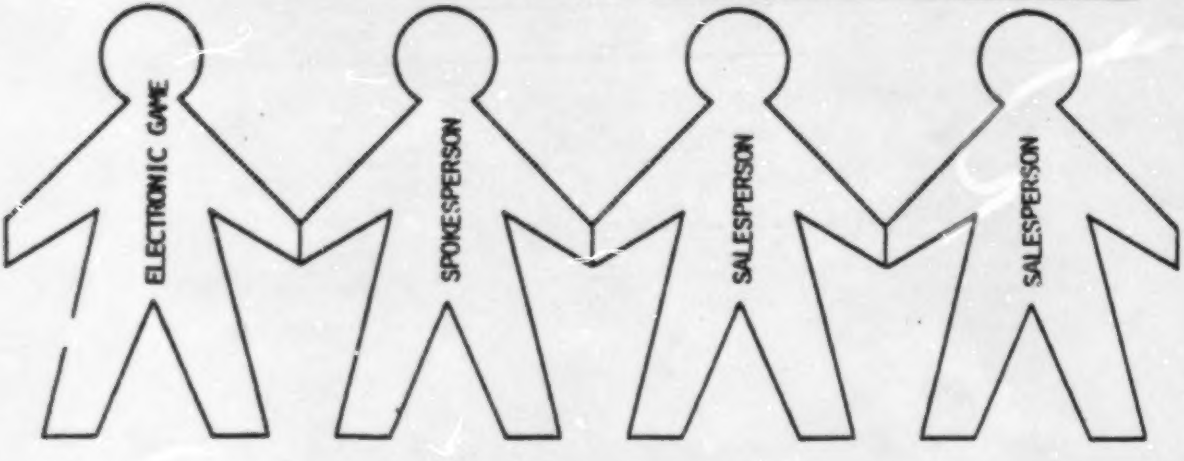
YOU MUST CONVINCE AN AUDIENCE OF PROSPECTIVE BUYERS THAT YOU HAVE THE BEST PRODUCT ON THE MARKET* BE CONVINCING SINCE THE COMPETITION IS TOUGH. SALE OF A PRODUCT EARNS A $50 BONUS FOR EACH COMPANY MEMBER.



* CHOOSE YOUR OWN MANUAL COUNTING DEVICE, E.G., CUBES, BEANS, ABACUS.

SITUATION

YOU MUST CONVINCE AN AUDIENCE OF PROSPECTIVE BUYERS THAT YOU HAVE THE BEST ELECTRONIC GAME ON THE MARKET* CONVINCE THE AUDIENCE THAT THIS IS A PRODUCT THAT THEY CAN'T LIVE WITHOUT. BE VERY PERSUASIVE SINCE THE COMPETITION IS VERY TOUGH!!! EACH COMPANY MEMBER GETS A FREE TEN-SPEED BIKE FOR EACH PRODUCT SOLD.

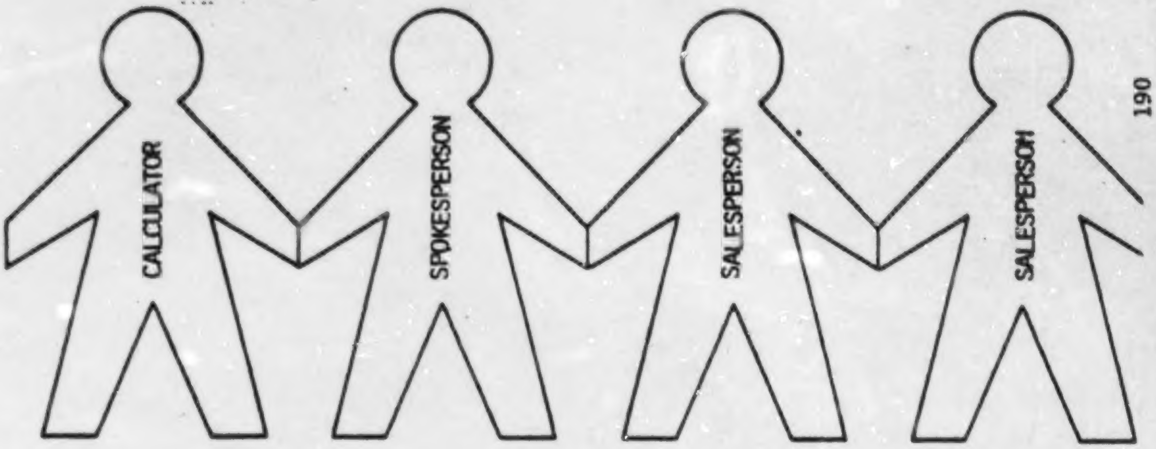


* CHOOSE YOUR OWN ELECTRONIC GAME, E.G., "SPEAK AND SPELL", "DATAMAN", "LITTLE PROFESSOR", ETC.

ROLE-PLAYING CARDS

SITUATION

YOU MUST CONVINCE AN AUDIENCE OF PROSPECTIVE BUYERS THAT YOU HAVE THE BEST CALCULATOR THAT MONEY CAN BUY!!! BE CONVINCING SINCE THE COMPETITION IS TOUGH!!! EACH SALE EARNS COMPANY MEMBERS 1 EXTRA WEEK'S VACATION.



COMPUTER USERS

List as many areas as possible that use computers.
If possible be specific (with respect to Winnipeg)

- CPAIR AIR CANADA	- Ticket reservation - travel times of arrival and departure - confirmation of flights - air traffic control
- Business Offices Department stores - The Bay Dominion Eatons Canadian Tire	- credit line - balance on accounts - check outs - inventory control
- Autopac	- keeps records of accidents and cars licenses.
- Motor Vehicle Branch	- driver's licence and records.
- Manitoba Telephone System	- computerized exchanges - telidon
- Manitoba Hydro or Winnipeg Hydro	- customer accounts - emergency
- Newspapers	- word processors - computerized typesetting
- Bristol Aerospace	- line of production - knows how each person has completed production on parts. - testing of parts and work
- Banks	- customer accounts, balances, personal info. - Royal bank has 24 hr banking system - deposits, withdrawals, records.
- Schools	- recording student progress - student activities in classroom - marking tests - payroll
Publishers	- subscriptions to clients - word processing of books
- Government	- taxation - personal info - Statistics Canada (census) - Dept of Ed. - teacher records, personal information

- Hospitals
  - in the Cardiac Dept - monitoring heart patients
  - Medical records
  - test results
  - medical diagnosis
- Large corporations
  - accounting for the business
  - stock market results and transactions
- Unicity Cab
  - replaces old meter system.
- Harvey Williams U of M
  - to publish his newsletter.
- RCMP - tracking owner and cards via license numbers
  - also drivers license - check validity
- Libraries - security checkout system and cataloguing books
- Garages
  - computerized scopes
- Manufacturing - computers cutting fabric to pattern
  - computers cutting wood for furniture production
  - for work in unsafe environments

V-1(b)-5.1
(E,P)

SAMPLE LESSON

Computers are becoming more prevalent in our society with the advancement in technology. An awareness of this growth is necessary to gain an understanding of the impact of computers.

Objective: Sutdents will:

1. Use interviewing techniques to complete the questionnaire.
2. Develop an awareness of computer use in society.

Material:

1. How to develop a questionnaire - V-1(b)-5.2
2. Teacher sheet - V-1(b)-6.4
3. Student sheet-questionnaire - V-1(g)-5.3
4. Chart paper

Procedure:

1. Make a chart for the classroom which displays these four areas; occupations, stores, transportation, and services.

2. Have the students brainstorm for examples from their town/city for each area (see accompanying teacher sheet for possible suggestions).

3. Discuss the "How to Develop a Questionnaire" sheet. Brainstorm for computer questionnaires.

4. Discuss the student questionnaire with the class.

5. Divide the class into four groups and assign each group one of the four headings.

6. Each group is responsible for obtaining the information necessary for completing a questionnaire. Try to find as many examples under each heading as is possible. Information might be obtained from personal and/or telephone interviews, magazines, newspapers, or non-fiction books.

7. Completed questionnaires are to be returned as soon as possible and ✓or x placed beside the specific examples on the chart to indicate whether or not computers are used. Use V-1(b)-5.5 as an aid in summarizing and recording results.

How To Develop A Questionnaire

READINESS EXERCISE

Present students with an example of each of the following four types of questions. Discuss how each question is formed, how much choice is given to the person answering the question and the advantages and disadvantages of each type of question.

1. FORCED CHOICE

Do you like dogs?

YES ______ NO ______

Do you like pizza?

YES ______ NO ______

2. SCALE

Do you like rainy days?

______ Not at all

______ Not very much

______ O.K.

______ A lot

______ Very much

3. RANKING

Number these meats in the order you like them.

______ Liver

______ Steak

______ Hamburger

______ Bacon

4. OPEN-ENDED

What is your favorite sport?

SAMPLE QUESTIONNAIRE

1. CHECK ONE ANSWER.

   A) COMPUTERS ARE IMPORTANT IN MY LIFE.

   ______YES ______NO

   B) I HAVE USED A COMPUTER.

   ______YES ______NO

   C) I CHOOSE TO LIVE WITHOUT COMPUTERS.

   ______YES ______NO

   D) I FEEL COMFORTABLE WITH COMPUTERS.

   ______YES ______NO

   E) BAD CHANGES WILL COME BECAUSE OF COMPUTERS.

   ______YES ______NO

2. HOW DO YOU FEEL ABOUT COMPUTERS? (CHECK ONE)

   ______LOVE

   ______LIKE

   ______SO-SO

   ______DISLIKE

   ______HATE

3. WHAT SHOULD PEOPLE DO ABOUT THE INCREASING USE OF COMPUTERS IN THEIR LIVES? RANK CHOICES BY NUMBERING FROM 1 TO 4, WHERE 1 IS THE BEST CHOICE.

   ______LEARN A LITTLE ABOUT COMPUTERS.

   ______IGNORE THEM. NOT EVERYONE NEEDS TO KNOW ABOUT COMPUTERS.

   ______LEARN A LOT ABOUT COMPUTERS.

   ______STOP THE SPREAD OF COMPUTER TECHNOLOGY NOW.

4. HOW WOULD YOU FEEL IF YOU SAW A COMPUTER BEING DELIVERED TO YOUR PLACE OF WORK, YOUR HOME, OR YOUR SCHOOL? WHAT WOULD YOU DO?

V-1(b)-5.3

QUESTIONNAIRE

NAME ______________________

DATE ______________________

____
(Business, Service, Occupation)

Are computers being used in the operation of your business, service or occupation?

YES ☐

a) When did computers first start being used? ______________

____

____

b) How many are being used? _____

c) What kind of computer is being used? ______________

d) What kind of tasks does the computer do? ______________

____

e) Have any problems arisen as a result of using the computer?

____

____

f) Additional Comments: ________

____

____

NO ☐

a) Are there any specific reasons as to why computers are not being used? ________

____

____

b) Are you aware of computer use in a business, service or occupation like yours? ______

c) Would you be interested in using a computer in your work? What would it be used for?
Yes ☐ why? ______________

____

No ☐ why not? ______________

____

d. Additional Comments: ________

____

____

____

TEACHER SHEET

OCCUPATIONS	SHOPS-STORES	TRANSPORTATION	SERVICES
Accountants Architects Artists Dentists Doctors Electricians Engineers Farmers Grain Buyers/ Fertilizer Dealers Lawyers Nurses Optomotrists Photographers Plumbers Principals Professors Secretaries Teachers Veterinarians	Appliance Bakery Book Cleaners Clothing Department Drug Flower Furniture Grocery Liquor Music Pet Plant Shoe Sporting Goods Toy	Airports Car Rental Dealerships City Buses Moving Companies NASA (Florida) Railway Taxi Trucking Firms	Art Gallery Banks/Credit Unions Churches City Hall Construction Firms Garbage Collectors Government Hotels/Motels Insurance Company Janitorial Services Libraries Museums Phone Company Post Office Radio Stations Real Estate Agencies Restaurants Service Stations Sports Arena Television Studios Travel Agencies Utilities (Hydro, Water, etc.)

SAMPLE SUMMARIES OF THE SURVEY

1. USE TALLY MARKS AND GENERALIZED STATEMENTS TO SUMMARIZE FORCED CHOICE AND RANKING QUESTIONS.

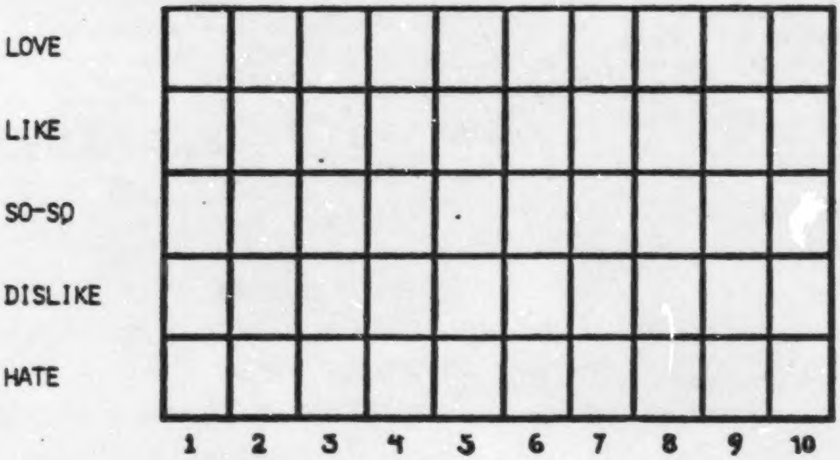
E.G. I OWN A HOME COMPUTER. YES |||
No 卌 卌 卌 卌 ||

∴ MOST PEOPLE DO NOT OWN HOME COMPUTERS.

2. DRAW BAR GRAPHS TO SUMMARIZE SCALE QUESTIONS.

E.G.

HOW PEOPLE FEEL ABOUT COMPUTERS



3. USE ANECDOTAL RECORDS OF OPEN-ENDED QUESTIONS.

E.G. HOW DO YOU FEEL ABOUT RAPIDLY ADVANCING COMPUTER TECHNOLOGY?

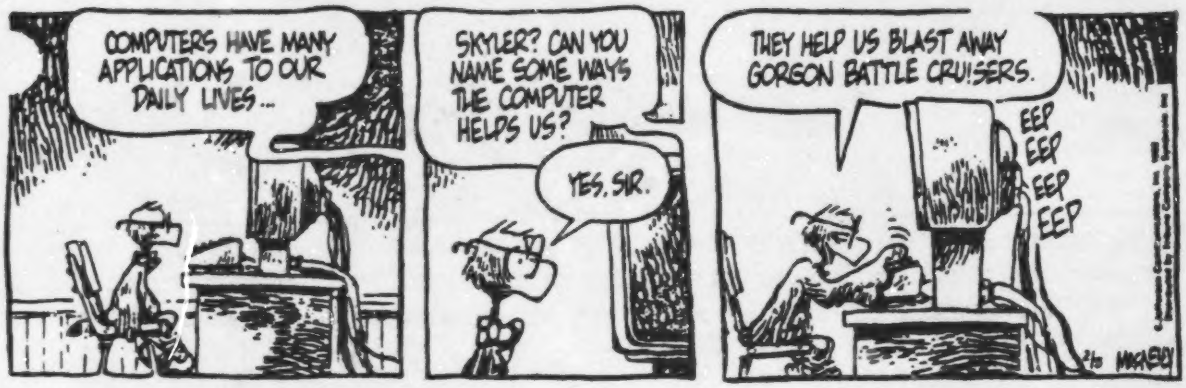
I try not to think about it.

excited!

worried

good

fine


COMPUTERS HAVE MANY APPLICATIONS TO OUR DAILY LIVES...
SKYLER? CAN YOU NAME SOME WAYS THE COMPUTER HELPS US?
YES, SIR.
THEY HELP US BLAST AWAY GORGON BATTLE CRUISERS.
EEP EEP EEP EEP
2/10 MacNELLY

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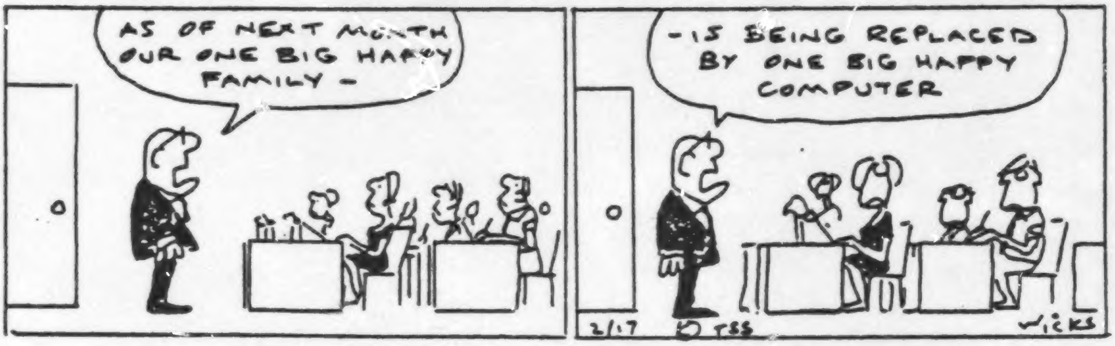
Toronto Star Syndicate

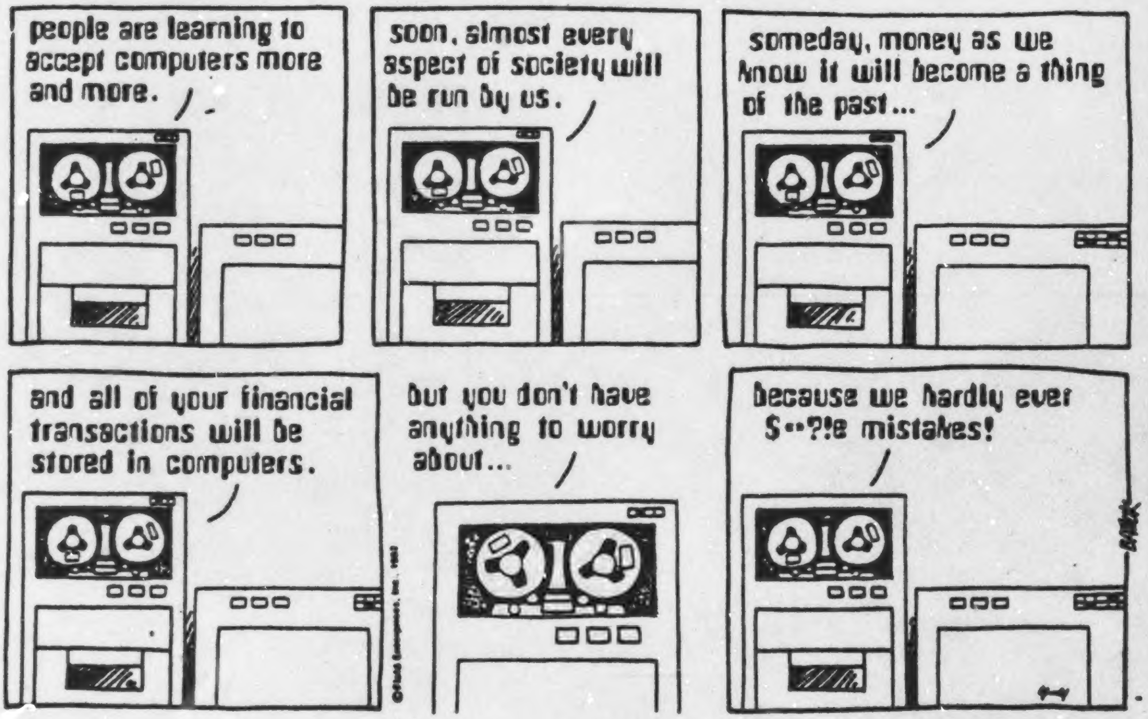
1. Why is this cartoon funny?
2. Can you answer the teacher's question?
3. How would you feel if your classroom had computers?
4. What changes would you have to adjust to?
5. How would you adjust to these changes?

THE OUTCASTS *by Ben Wicks*


AS OF NEXT MONTH OUR ONE BIG HAPPY FAMILY -
- IS BEING REPLACED BY ONE BIG HAPPY COMPUTER
2/17 © TSS
WICKS

Reprinted with permission,
Ben Wicks, Toronto Star
Syndicate

1. This cartoon is saying that many workers will lose their jobs because of computers. Is this message true? Explain.
2. How would you feel if you were one of these workers?
3. What would you do if this happened to you?


people are learning to accept computers more and more.
soon, almost every aspect of society will be run by us.
someday, money as we know it will become a thing of the past...
and all of your financial transactions will be stored in computers.
but you don't have anything to worry about...
because we hardly ever $··?!e mistakes!
BATIUK

Courtesy of Field Newspaper Syndicate
Reprinted with permission - Funky Winker Bean by Tom Batiuk. (c) 1982 Field Enterprises, Inc.,

1. WHY IS THIS CARTOON FUNNY?
2. IS IT TRUE THAT COMPUTERS "HARDLY EVER MAKE MISTAKES"?
3. WHAT PREDICTIONS ARE MADE IN THIS CARTOON?
4. DO YOU AGREE THAT THESE PREDICTIONS ARE REALISTIC? ARE THEY DESIRABLE?